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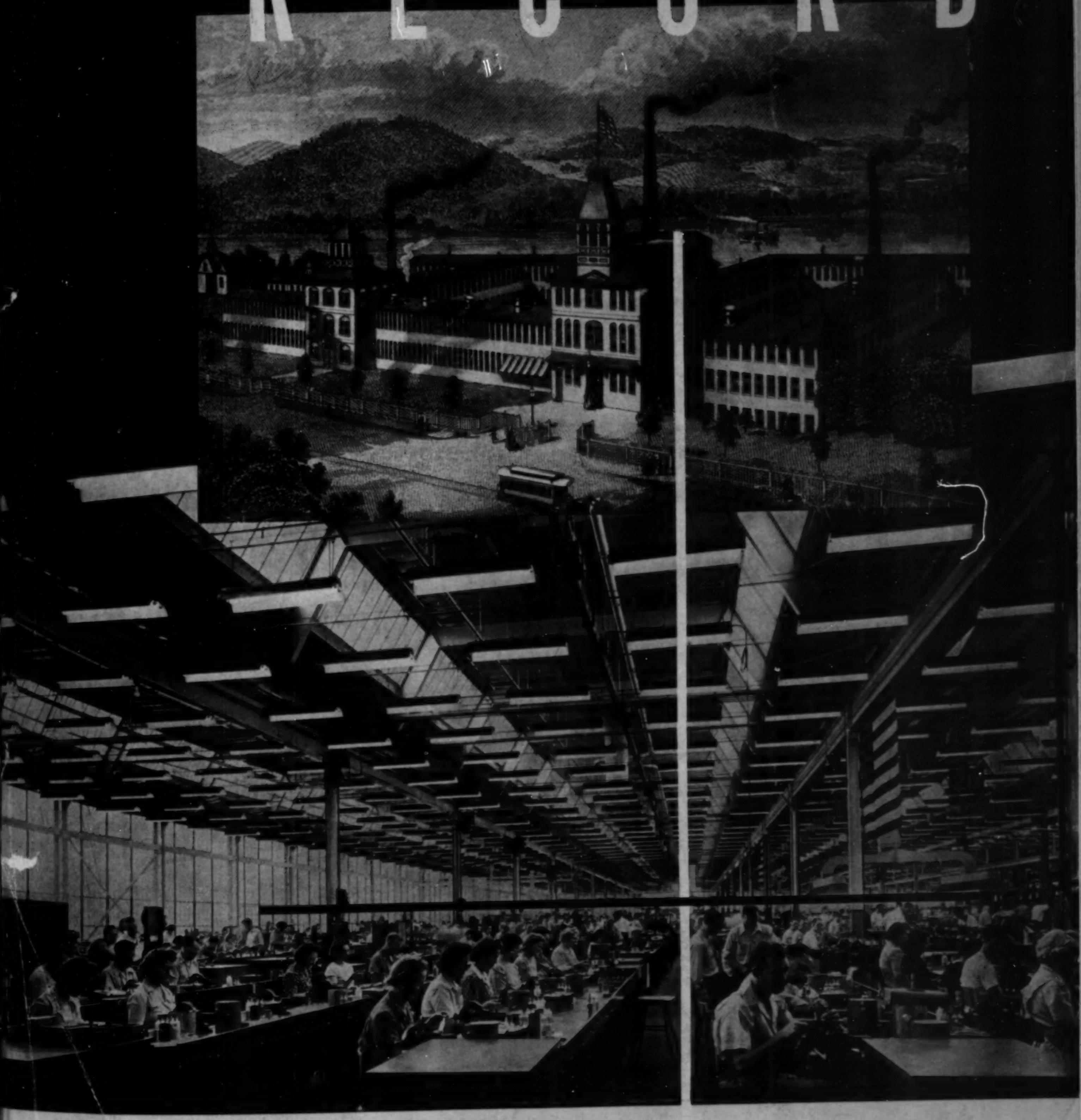

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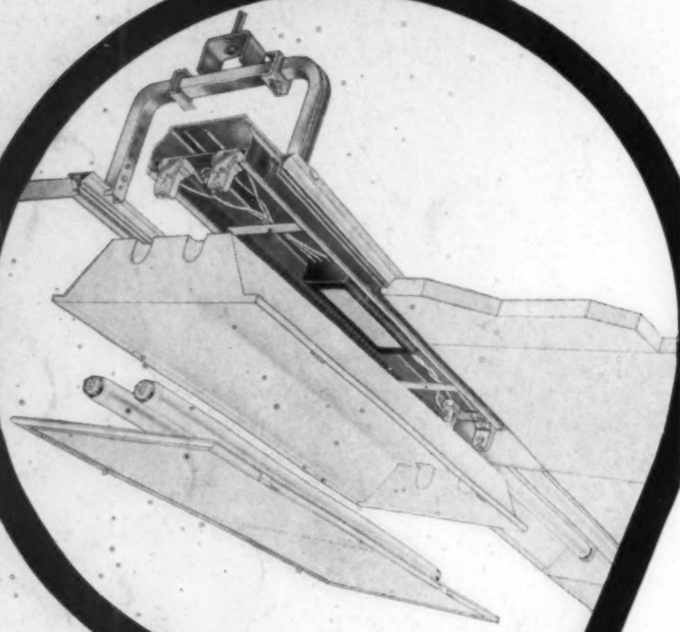

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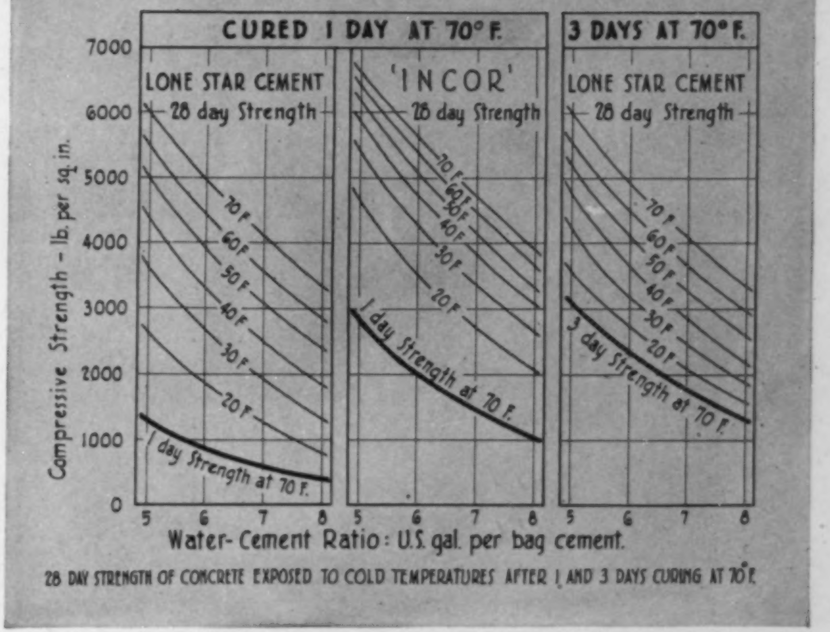

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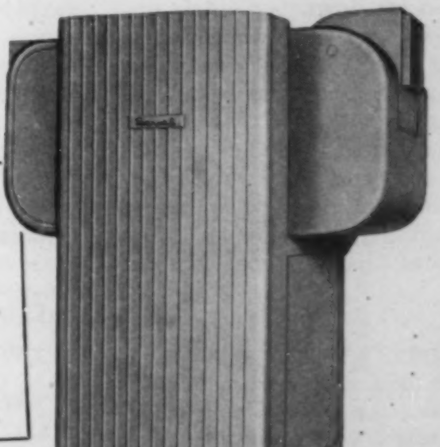

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The new $11,000,000 General Hospital recently completed at Houston, Texas, by the Navy Department, gives some splendid examples of "Preventive Engineering" as applied to the control of maintenance in corrosive piping services. Piping materials were carefully matched to conditions.

The project comprises a total of 37 buildings. In the principal buildings, galvanized wrought iron was used for downspouts and underground gas lines, and black wrought iron for the concealed steam supply lines and steam return lines.

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ARCHITECTURAL RECORD

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ADJUSTABLE to the actual water needs of the fixture

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Watrous Flush Valves

THE RECORD REPORTS

Building Decontrol Demands Are Being Met • Prices and Strikes Are Watched • Building Supplies Gain Guaranteed Contracts Are Let • Lumber Steps Taken

The new Congress is expected to go along with the building industry, rather than the federal housing agencies, and pull steadily away from government regulation.

Building decontrol steps taken by the Administration, following industry pressure and the Republican sweep in the elections, will be extended, where legislative action is necessary.

Election results generally are interpreted as a call to change government tactics and to let the laws of supply and demand and competition operate in the national economy.

Many observers feel that the 1947 building year will see construction freed of practically all reconversion rulings from Washington.

Even as the Administration went into a huddle on decontrols, building industry leaders were voicing a concerted demand for such action. At the National Housing Conference held by the American Legion in Washington, D. C., during election week, they called bluntly for an end to government regulation on prices and materials, particularly because of its disruptive effects on distribution.

Under fire were not only price and material hobbles but also subsidy payments and guaranteed markets. Sentiment remains in numerous quarters for retention of rent control on existing housing but not on new housing. (See "Political Housing — A Route to Inflation," by Thomas S. Holden; ARCHITECTURAL RECORD, Oct. 1946, pp. 90–93.)

"By eliminating restrictive price ceilings and the unfortunate subsidy program, we can be assured of an ample supply of materials for the 1947 construction program, and we can be assured that there will be no net increase in actual materials costs," said Douglas Whitlock, chairman of the Building Products Institute.

"Let free enterprise produce at its utmost capacity without hindrance by government directives, allocations, regulations or subsidies. That is the only way to get large scale, balanced production of housing components," comments George W. West, of the U. S. Chamber of Commerce.

"Lift all controls on materials, construction, sales prices and rents on new housing. No further subsidy payments should be made to any segment of the home building industry." These are among the points made by Herbert U. Nelson, of the National Association of Real Estate Boards.

"We are convinced that the time has come for the federal government to relinquish all restrictive controls in the construction field. The primary source of the trouble is to be found in the disorganized condition of the industry, a condition that has not been brought about by the industry itself, but that results from interference with the normal operations of supply and demand," said Louis Justement of the American Institute of Architects.

The National Association of Home Builders, the National Lumber Manufacturers Association, the National Retail Lumber Dealers Association and others joined in pressing for the discontinuance of controls.

Government Sees Headaches

From the viewpoint of government, Washington's housing men see plenty of rough going for building in 1947 despite "progress" to date in the veterans' emergency program. While some current headaches will ease up as materials production improves still more, officials expect new complications to arise. Then, aside from their own difficulties, they are not sure of what Congress will do or how general economic shifts will affect construction.

As to Congress the administration has two main concerns: (1) enactment of the general housing bill which died last session; (2) continuation of present building controls. Scarcely had the 79th Congress ended its second session than Housing Expediter Wilson W. Wyatt announced that he would press for passage of the general housing bill in 1947. On building controls it will be remembered that, in extending OPA, Congress directed that the President by next April report on housing and other commodities which may need continued price ceilings.

Watch Prices, Strikes

As to the general economy, officials particularly are watching two main influences — prices and strikes. The National Housing Agency states it pointedly: "It goes without saying that the program would suffer seriously and the realization of its objectives would be defeated by any major price increases or by extensive work stoppages."

Cited among new complications for the 1947 program is a growing shortage of land and utilities. NHA expects large-scale small-house building operations to be increasingly important and points out that such projects require large parcels of land. In general, it estimates that builders' land inventories will be used up and that "high asking prices for developed lots" will lead them to city outskirts and raw land.

Developments on raw land will require more utilities materials, officials explain, and city departments and private utility companies have begun to feel the pinch of short supply. Too, some communities may run into financing

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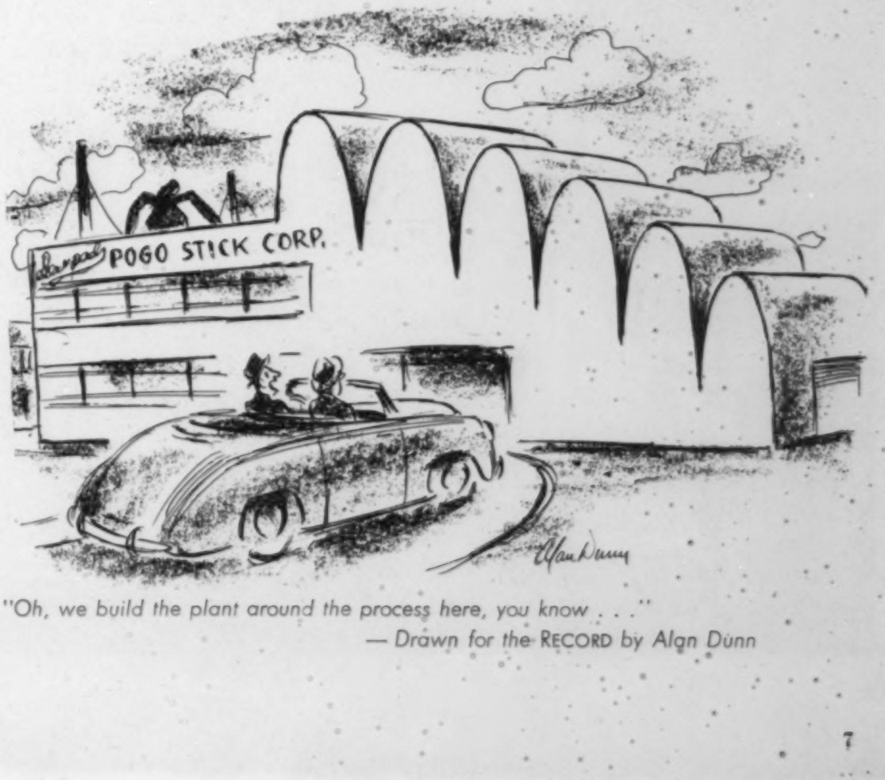
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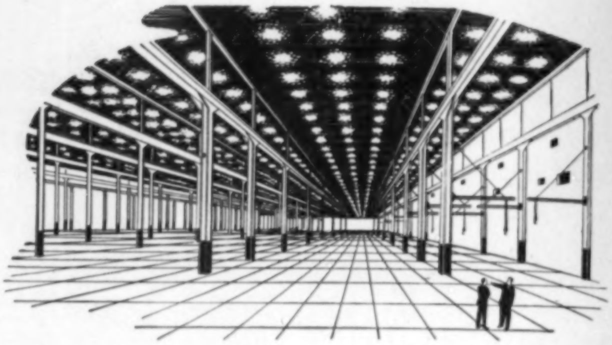

Today, more than ever before, Carrier leads in air conditioning and refrigeration. For the acquisition of a huge, new 660,000-sq.-ft. plant in East Syracuse gives Carrier Corporation facilities that are among the largest, most modern in the world for the manufacture of air conditioning and refrigeration equipment!

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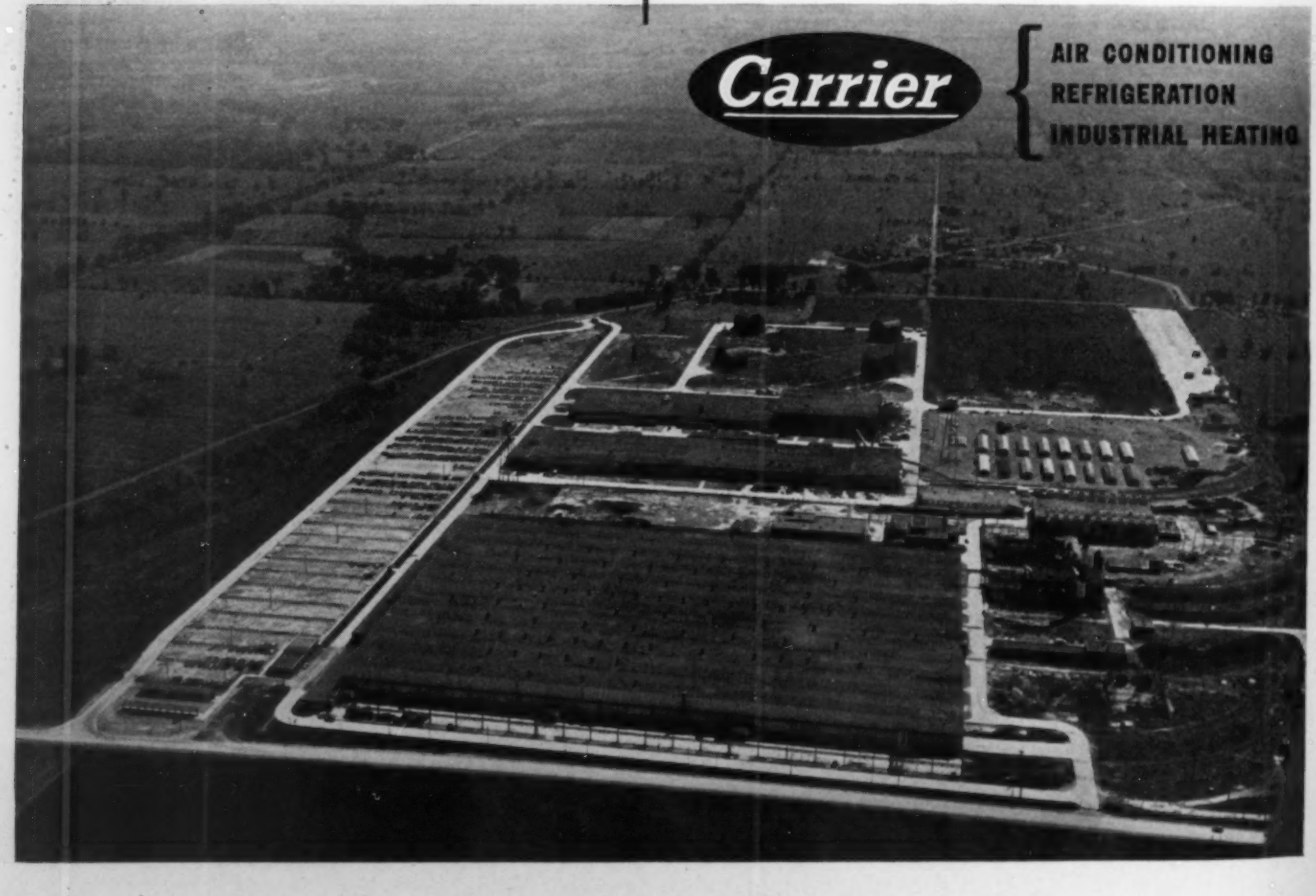
Here, in these vast new facilities, is impressive evidence of Carrier's position in the air-conditioning field . . . a dramatic re-statement of the Carrier leadership which began with the creation of air conditioning 44 years ago.



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AIR CONDITIONING
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STEEL FRAMING IS SIMPLIFIED, EFFICIENT AND ECONOMICAL

BUILD WITH STRAN STEEL

● SIMPLICITY—With versatile Stran-Steel, only a few basic types of framing members are required. Assembly on the site is fast and easy, because all materials are pre-cut to precision lengths. Erection tools are simple, too; ordinary carpenter's equipment does the job.

● EFFICIENCY—Stran-Steel framing can be assembled quickly with sheet metal screws or by welding. Collateral materials are *nailed* securely *to the frame itself* by means of the *nailing groove*, a patented feature of all Stran-Steel joists and studs. Architects have full latitude in working out widely varied exteriors in brick, lumber, stone and other materials.

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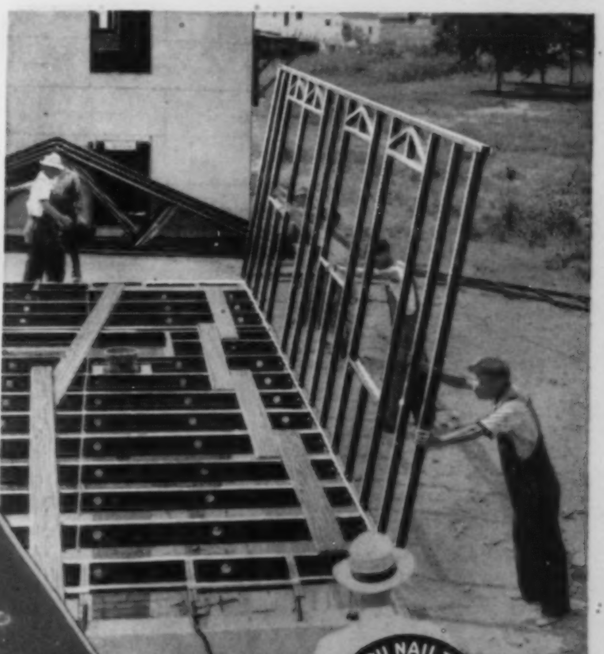


YOU NAIL TO STRAN STEEL FRAMING

Stran-Steel products are building products of Great Lakes Steel Corporation.

THE RECORD REPORTS *(Continued from page 7)*

and other delays in providing public facilities and services to new developments.

Building Supplies Gain

As the final 1946 quarter moved along, a still spotted but improving picture on building materials was noted with NHA citing "impressive increases." Both NHA and CPA continued their efforts to channel more and more materials directly into veterans' housing. They added six more items to the priority list, bringing to 66 the materials covered. Added items are electrical service entrance equipment, furnace pipes and fittings, copper tubing and fittings, copper sheet, galvanized steel sheet, and building papers and sheathing papers.

CPA restricted the $15,000 "small job allowance" on industrial building to structures of 10,000 sq. ft. or more; it extended controls over swimming pools, boardwalks, roller coasters, drive-in theaters, parking lots and tennis courts. More lumber, millwork, hardwood flooring and construction plywood were made available on HH ratings.

While all this was going on there was much concern over the growing black market on nails. In a related series of actions, NHA Chief Wyatt approved a premium payment plan on nails and nail rod; leading nail manufacturers took steps to boost production goals to the record high of 77,000 tons a month by December, and nails were put on the critical list for HH ratings.

Further continuing his stimulus to building materials production, Wyatt issued the tenth premium payment regulation — for sand lime brick. Plants whose output is affected by winter weather will be allowed special adjustments on quotas.

Guaranteed Contracts

The Housing Expediter also began putting guaranteed market contracts into play. Nearly 30,000 factory-built homes are called for under the first two such contracts. One with the Homeola Corporation of Chicago calls for 19,400 plywood structures, and the other with the William H. Harman Corporation of Philadelphia is to cover 10,000 steel houses. A third contract was entered into with American Fabricators of Louisville for 7500 plywood houses. Homeola expects to step up production to 100 houses a day while the Harman group plans to start with 50 houses in December and to increase output to a peak of 1000 by next May. RFC will purchase at 90 per cent of the factory price any house that the producers cannot sell.

Negotiations were placed under way with Andrew J. Higgins of New Orleans regarding a "package" of panel units for the walls, partitions and ceiling of a house but not including the roof, floor, doors and trim, cabinets, plumbing, heating and electrical work. The panels include two steel sheets faced with a mat-surface vitrified enamel with a core of expanded concrete.

In connection with the emphasis on prefabrication, the Prefabricated Home Manufacturers' Institute advises of progress in the South in modernizing building codes to provide workable regulations for the construction of prefabricated homes.

Official hopes for the prefabricated home program were hit heavily in November by the RFC refusal to grant initial requests for credit in this field. The cases, involving an estimated 100,000 houses, were considered bellwethers with potentially wide indirect effects.

Lumber Steps Taken

With the lack of lumber sending shivers up the governmental hierarchy clear to the White House, President Truman temporarily waived duties on imported timber, lumber and lumber products. Included among the products are flooring, plywood, red cedar shingles and packing boxes. Reason for the move, say those in the know, is that competitive bidding on world markets could swing potential imports away from this country.

Coincident with this, lumber imports passed prewar highs, coming in at the rate of 1.4 billion board feet a year or twice the average prewar figure. Inflow of some scarce building materials also increased, including plywood, wood shingles, plaster rock and gypsum and building brick. Official word is that Finland and Sweden may ship us wooden prefabricated houses.

Another official note on lumber is an estimate that 1946 production may reach 33 billion board feet, or 5 billion above last year. As to 1947, Expediter Wyatt anticipates that the total will be swelled by 1.6 billion board feet due to the 2700-mile access road program.

Surplus Sales Slanted

The federal government's surplus property sales during the fall were slanted heavily to the veterans' housing program. In fact, the War Assets Administration promised that "virtually all" war surplus building materials and equipment would be made available for veterans' housing by the start of winter. Its streamlined sales plan was expected to get rid of all such surplus goods before Christmas, possibly by December 1.

In another field, WAA moved to boost the output of pig iron for housing. It leased the blast furnace at Gadsden, Ala., for production under the NHA premium payment program. NHA announced further that three other blast furnaces would produce for housing under premium payments. A CPA order provides for allocations of pig iron for bathtubs, sinks and lavatories, cast iron soil and pressure pipe, builders' hardware, etc.

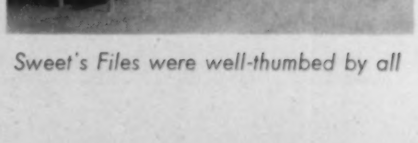
(Continued on page 13)

American prefabs attracted Paris crowds

AMERICAN HOUSING SHOWN IN PARIS

In five weeks in the early part of last summer an exposition of American housing and planning techniques at the Grand Palais in Paris drew nearly a quarter of a million visitors.

Covering almost five acres, and including samples of more than 200 different American building materials and pieces of household equipment, the exposition also contained much technical data, photographs of hundreds of houses and housing projects, a dozen films on construction methods, and a complete library of American housing information, including all representative periodicals and books. Four pre-fabricated houses, each completely furnished in typical American style, were special attractions. A complete set of Sweet's Files was prominently displayed in the information section, proved so popular that replacements were called for before the exhibit moved on to Brussels, Prague and other cities.



Sweet's Files were well-thumbed by all

TOPS FOR ANY HOUSE!

Reynolds Lifetime Aluminum Shingles being applied on a fine home in Kentucky. Note the attractive shadow line, the ease of application and simplicity of design . . . for a lifetime roof.

REYNOLDS *Lifetime* ALUMINUM SHINGLES

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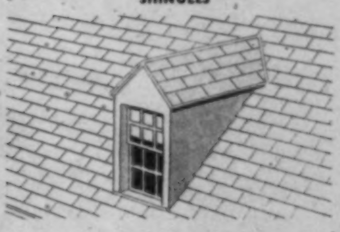
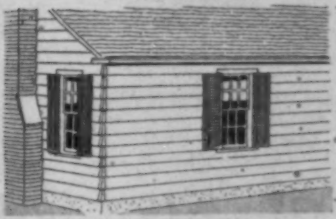
REYNOLDS LIFETIME ALUMINUM SHINGLES



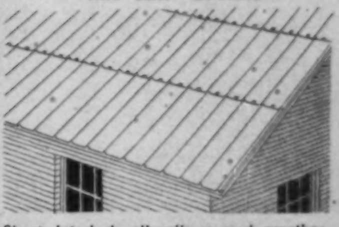
Completely interlocking, covering nails. Coverage, 8" x 14½". Shadow line, ¼".

CLAPBOARD SIDING



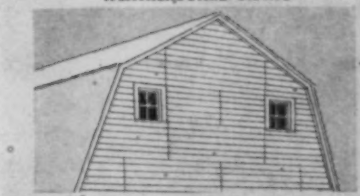
Individual clapboards fit together, covering all nails. 8" exposed surface, 12' lengths.

"SNAP-SEAL" ROOFING



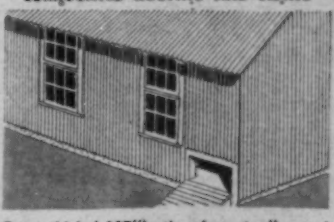
Sheets interlock, all nails covered, weather-tight. 6, 8, 10 and 12 feet, 24" coverage.

WEATHERBOARD SIDING



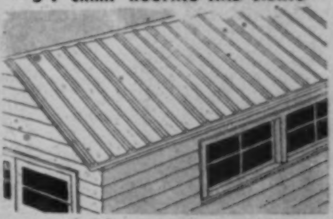
Sheet crimped in simulation of 4" clapboard. 8, 10 and 12 feet, 24" coverage.

CORRUGATED ROOFING AND SIDING



Extra thick (.027")—therefore sturdier, yet lighter. 6, 8, 10, 12 feet, 26" wide.

5-V CRIMP ROOFING AND SIDING

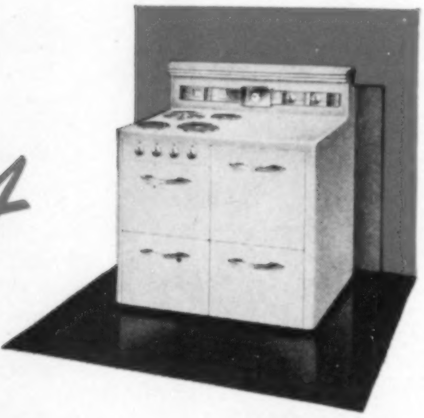


Same extra thickness means sturdier sheet yet lighter. 6, 8, 10, 12 feet, 24" coverage.

Also Aluminum Studs, Trusses, Window Frames, Garage Doors, complete Houses.

NATIONAL MAGAZINE SURVEYS PROVE WOMEN WANT

Electric Ranges



WOMAN'S HOME COMPANION survey shows that *more* women plan to buy an Electric Range than *any other* type!

McCALL'S MAGAZINE readers made the Electric Range their 2-to-1 "must have" choice in a recent contest.

SUCCESSFUL FARMING survey shows that nearly twice as many REA customers intended to soon buy an Electric Range as then had one.

HOUSEHOLD MAGAZINE survey indicates that 3 times as many women want Electric Ranges as "now have" them.

COUNTRY GENTLEMAN survey shows that among the upper two-thirds of white farmers, the Electric Range is the 2-to-1 choice!

WOMAN'S HOME COMPANION
COMPANION
McCALL'S MAGAZINE
McCall's
SUCCESSFUL FARMING
SUCCESSFUL FARMING
HOUSEHOLD MAGAZINE
HOUSEHOLD
COUNTRY GENTLEMAN
Country Gentleman

Magazines can't guess about the preferences of their readers. They've got to KNOW—and they find out by making surveys.

These magazines found both on the farm and in the city an overwhelming preference for ELECTRIC RANGES. The convenience, cleanliness, dependability and economy of electric cooking are getting across to women everywhere.

Your houses can take advantage of this trend at little cost. Just build in the wiring for Electric Ranges. It's one of the most sales-worthy features you can install!

Electric Range Section
NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
155 E. 44th Street, New York 17, N. Y.

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HOTPOINT · KELVINATOR · LEDO · MONARCH · NORGE · QUALITY · UNIVERSAL · WESTINGHOUSE

TO KEEP THEM MODERN
Wire your houses
FOR ELECTRIC RANGES

THE RANGE SERVICE OUTLET
A SYMBOL OF THE MODERN POST-WAR HOME

Labor Still Short

Labor shortages continue to be a problem in construction. These are expected to show up even more as materials bottlenecks are broken. The United States Employment Service reports major labor markets encountering shortages in skilled building crafts, especially carpentry and bricklaying.

"In tight areas, hope for relief during the seasonal down-swing of construction activity," says NHA, "was somewhat tempered by the realization that any considerable movement of workers would be restricted by the housing shortage itself. The customary mobility of construction workers, however, coupled with declining job opportunities in northern areas, will undoubtedly furnish some additional workers for labor-short areas in the South and Southwest."

The Labor Department reported that a million and a quarter construction employees were added to the work force in the 12 months following the war's end, bringing August 1946 employment to 2,321,000.

From Many Sources

With construction playing an increasing role in the national economy, numerous federal agencies contribute to the overall mosaic on construction. Here are items from widely ramified sources:

The Home Loan Bank System expects home financing credit by member associations to approach the record volume of $7 billion for the 1946–47 period — $4 billion for houses under VEHP.

Public Health Service advises that preliminary surveys under the new Hospital Construction Act are progressing in many states. Twenty had completed their surveys in October and 20 more were doing so. A Division of Hospital Facilities has been set up in the Public Health Service to help carry out the program.

This special division represents a sizable expansion of the former Hospital Facilities Section and is divided into four units, known as the Office of Program Planning, the Office of Program Operation, the Office of Technical Services and the Office of Hospital Administrative Standards. Under the Office of Technical Services come standards and plans covering the architectural phases of construction, including design, blueprints, etc., from the states. Much preliminary work is to be done through the district offices, which must approve construction applications before they go to Washington, D. C. Marshall Shaffer is heading the Technical Services unit.

Department of Justice was expected to appeal the Federal Circuit Court decision in Chicago which threw out the Federal Trade Commission's order against basing point prices for cement.

NHA in an analysis of HH authorizations for the January 15–March 29 period advises that eight out of ten were single-family detached houses. One-story houses were most popular, representing about 70 per cent. About 40 per cent of the dwellings were five-room and another 40 per cent were divided between four- and six-room structures.

Commerce Department's Office of Technical Services has a 154-page report on two successful solar heat collectors developed under a WPB-sponsored wartime research which bring "effective use of the sun's heat for residential heating closer to realization."

(Continued on page 14)

CHARLES S. KEEFE

Word has been received of the death during the summer of Charles Schoonmaker Keefe, widely known house architect and an authority on Colonial American homes. Death came on July 19, the result of injuries sustained in a fall the evening before at Manchester, Vt., where he was supervising work on a client's house.

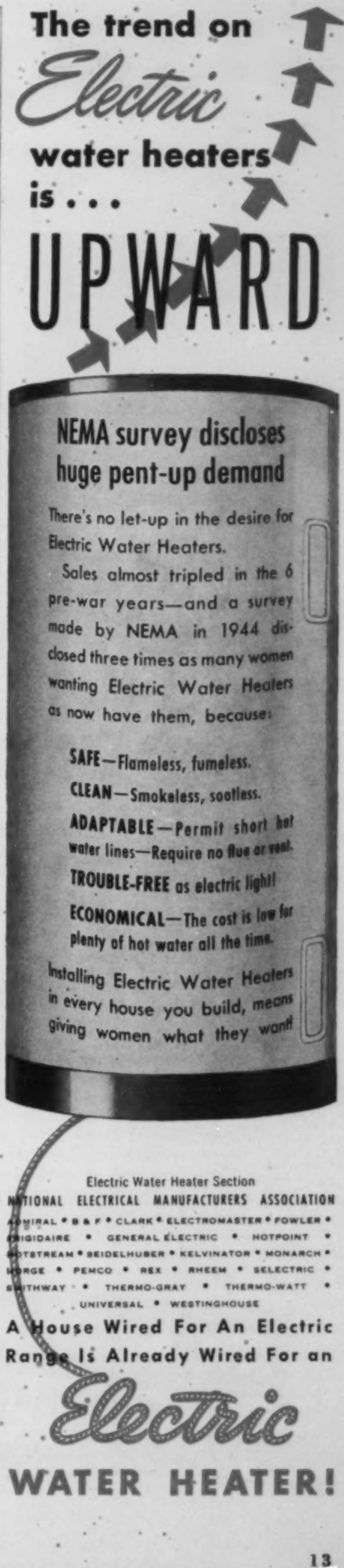
Specializing in residential design, and particularly in the small house field, Mr. Keefe was author of *The American House* and editor of the revised edition of *The Georgian Period*. His designs, for which he twice was awarded the bronze medal of the Better Homes in America organization founded by J. Lyman Wilbur, have been widely published in architectural and home-making magazines. His non-residential work included the American Legion Memorial Building and the Knights of Columbus Building in Kingston, N. Y., and the Crane Museum at Dalton, Mass., and the Wheatsworth Museum, Hanover, N. J., both restorations.

A member of the A.I.A., Mr. Keefe was president of the Mid-Hudson Valley Architectural Society.

CARLETON M. WINSLOW

Carleton Monroe Winslow, F.A.I.A., for many years a prominent member of the Southern California Chapter, A.I.A., died on October 16 following a long illness.

Formerly associated with Cram, Goodhue and Ferguson, Mr. Winslow was well known as a church architect. Among the churches he designed are the Community Presbyterian of Beverly Hills, the First Baptist of Pasadena, and Mary Star of the Sea in La Jolla, Calif.



The trend on Electric water heaters is . . . UPWARD

NEMA survey discloses huge pent-up demand

There's no let-up in the desire for Electric Water Heaters.

Sales almost tripled in the 6 pre-war years—and a survey made by NEMA in 1944 disclosed three times as many women wanting Electric Water Heaters as now have them, because:

SAFE—Flameless, fumeless.
CLEAN—Smokeless, sootless.
ADAPTABLE—Permit short hot water lines—Require no flue or vent.
TROUBLE-FREE as electric light!
ECONOMICAL—The cost is low for plenty of hot water all the time.

Installing Electric Water Heaters in every house you build, means giving women what they want!

Electric Water Heater Section
NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
ADMIRAL • B & F • CLARK • ELECTROMASTER • FOWLER • FRIGIDAIRE • GENERAL ELECTRIC • HOTPOINT • HOTSTREAM • SEIDELHUBER • KELVINATOR • MONARCH • NORGE • PEMCO • REX • RHEEM • SELECTRIC • SMITHWAY • THERMO-GRAY • THERMO-WATT • UNIVERSAL • WESTINGHOUSE

A House Wired For An Electric Range Is Already Wired For an Electric WATER HEATER!

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MAKES STAIR TREADS SO SAFE
YET SO EASY TO CLEAN
GRIP WITHOUT A SLIP!
EASY TO CLEAN!
EASY TO MATCH!

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Free—A 16 page booklet L-33 giving helpful information on weight per square foot, and maximum sizes. Alan Wood Steel Company, Conshohocken, Penna.

AW SUPER-DIAMOND

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A Product of **ALAN WOOD STEEL COMPANY**

Other Products: Billets • Plates • Sheets • Carbon & Alloy

THE RECORD REPORTS

(*Continued from page 13*)

NEW GROUPS FORMED

Research Institute

A new fact-finding and economic research organization, the Building Products Institute, has been formed by representatives of 200 companies and associations engaged in the manufacture of building materials and equipment. Douglas Whitlock, formerly chairman of the Advisory Board of the Producers' Council, has been elected chairman of the group, and offices have been set up at 1756 K St., N. W., Washington 6, D. C.

"The purpose of the Institute," Mr. Whitlock explains, "is to assemble, analyze and disseminate facts about the production of building materials and equipment and about the progress of construction, including housing. The Institute also will analyze and make recommendations with respect to proposed legislation affecting the construction industry."

Miles L. Colean, former assistant administrator of the FHA, will serve as economic consultant to the Institute.

International Standards

Howard Coonley, chairman of the American Standards Association has been elected president of the new International Organization for Standardization, the formation of which has just been completed by delegates from 25 nations meeting in London.

Gustave L. Gerard, staff president of the Belgian Standards Association, will be vice president to the new organization, expected to be known informally as the I.S.O. Headquarters will be set up shortly in Geneva.

Formation of the I.S.O. consolidates into a single organization the work of the old International Federation of National Standardizing Associations and that of the war-born United Nations Standards Coordinating Committee. The International Electrotechnical Commission is expected to affiliate with I.S.O. shortly as its electrical division.

The governing body of the new group will be a council of representatives from 11 countries. Five of these seats are assigned for a period of five years to China, France, Great Britain, the United States and Russia. Also represented initially on the council are Australia, Belgium, Brazil, India, Norway and Switzerland.

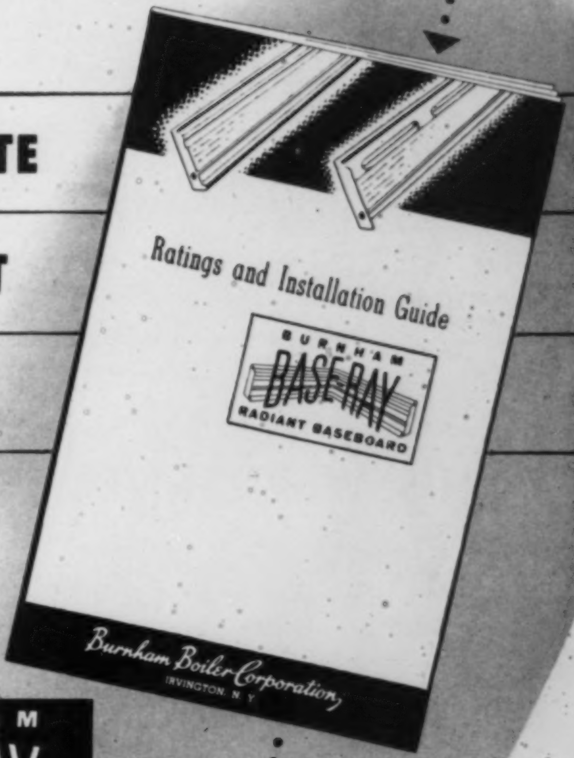
CHICAGO GETS SUBURB

A whole new town, providing homes for some 25,000 middle-income families, will be constructed on a 2300-acre site 25 miles south of Chicago, according to

(*Continued on page 16*)

THIS BOOKLET

GIVES ARCHITECTS UP-TO-DATE INFORMATION ON THE LATEST DEVELOPMENTS IN *Radiant Heating*

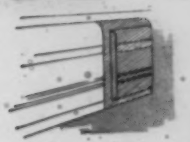


BASE-RAY is only 7" high and 1 ¾" thick

BURNHAM BASE-RAY RADIANT BASEBOARD

Radiant baseboard heating has been developed to a point of efficiency and utility that makes it a "must" for the truly modern home. BASE-RAY* *radiant* heating offers the architect a fresh and stimulating approach to the problem of up-to-the-minute home heating and BASE-RAY *radiant* baseboard units literally "clear the decks" for room designs that provide the utmost in charm and comfort. From the practical standpoint BASE-RAY units are so simple to install and so low in cost that you'll recognize in them an important contribution to home planning. National advertising of BASE-RAY is creating tremendous enthusiasm among householders and prospective home builders. Why not get all the facts . . . put yourself in a position to benefit from this public approval? Mail the coupon NOW. . . you will profit by the information contained in our booklet.

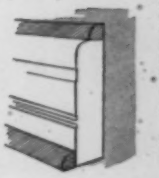
**Reg. U. S. Pat. Off.*



CONCEALED VALVES

This neat metal enclosure, shaped like the heating unit itself, is attached to each end of BASE-RAY, thus completely concealing all valves and fittings.

MOLDINGS



To provide an even more realistic baseboard appearance and to compensate for irregularities sometimes found in walls and floors, regular wood moldings are added at top and bottom of "Standard" BASE-RAY and at top only of "Hy-Power" units.

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RADIANT HEATING
SINCE 1873

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Irvington, New York
Please send me copy of "Ratings and Installation Guide on BASE-RAY Radiant Baseboards".

Name...

Address..

City.............................State...........

(*Continued from page 14*)

plans announced by the American Community Builders, Inc., a private enterprise group headed by Philip M. Klutznick, formerly commissioner of the Federal Public Housing Authority.

Field work is now under way, and construction will start as soon as the weather permits. Present plans call for houses selling from $7000 to $10,000, with provision for 600 rental units. The initial program will accommodate 5500 families, probably will provide 2800 single-family units, 650 twin houses for 1300 families, 200 "town and country" homes for 800 families and apartment buildings for 600 families.

The town will be divided into five contiguous residential neighborhoods. It will feature a central park and also contain a major shopping center, supplementary shopping centers, and a nonnuisance industrial area. Sites have been reserved for churches of various denominations, one high school, and five elementary schools around which the five neighborhoods will be centered. There will also be a town hall, bowling alleys, theaters, playgrounds, a swimming pool and picnic spots in the nearby State Forest Preserve.

The basic plan for the community was designed by Elbert Peets of Washington, D. C., in collaboration with Loebl and Schlossman of Chicago, staff architects for the project. The housing firm of Harrison, Ballard & Allen of New York has been retained to head the construction division.

RENTAL HOUSING INCENTIVE OFFERED

The National Housing Agency has issued a leaflet giving a full explanation of the Bureau of Internal Revenue's recent ruling permitting an increased rate of depreciation in the early years in computing income taxes on rental housing properties.

Considered an important additional incentive for developers to build rental housing, the new ruling reduces the rental operator's tax liability in the first ten to twelve years and increases the amount of cash derived from operations. Furthermore, the risk of the mortgagee is reduced during the critical years of the mortgage.

Specifically, the ruling permits the use of the declining-balance method of charging depreciation on rental housing properties, at a rate not exceeding 150 per cent of the straight-line rate applicable to such properties. If, for example, the straight-line rate is 2.5 per cent, the declining-balance rate would be 3.75 per cent.

(*Continued on page 18*)

Delivering *Protection* to the job

HERE'S PROOF

IT'S WOLMANIZED LUMBER*

This roof deck is going to last longer . . . they're using Wolmanized Lumber, the lumber impregnated with Wolman Salts* preservative—highly resistant to decay and termite attack.

It is recommended for use in structures exposed to:

(1) Moisture in artificially humidified buildings
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(5) Moisture condensed by concrete or masonry

When you buy Wolmanized Lumber, you get *pressure-treated* lumber—the only reliable kind.

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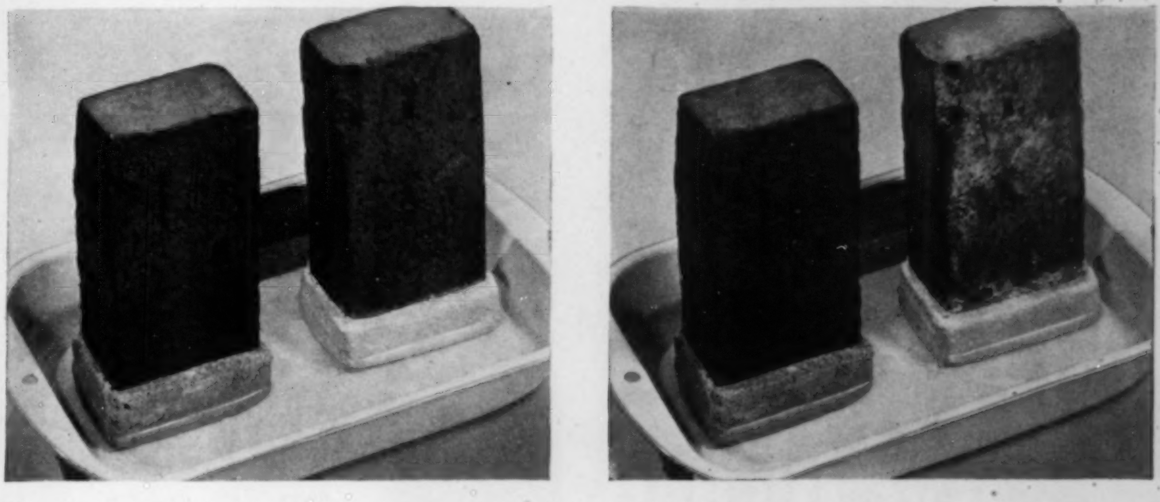
BRIXMENT MORTAR

Helps Prevent Efflorescence



To test two mortars for resistance to efflorescence, "cap" two brick heavily with the mortars — let harden, and keep both brick for a few weeks in a shallow pan of water, as shown. Try this with Brixment mortar!

HERE'S WHAT CAUSES EFFLORESCENCE—AND WHY BRIXMENT MORTAR HELPS CONTROL IT

Efflorescence is an outcropping of minute white crystals on brickwork. When these crystals occur on colored mortar joints, the condition is sometimes mistaken for *fading.*

Efflorescence is caused by the presence of soluble salts in masonry materials. When reached by water, these salts dissolve, and are drawn by evaporation to the surface of the wall.

Brixment itself *does not cause efflorescence* because it is practically free from soluble salts. Even when such salts are present in the sand or brick, the waterproofing in Brixment usually *prevents them from coming to the surface.*

Bricklayers who have used Brixment mortar for years say they have far less efflorescence with Brixment than with any other mortar.

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Manufacturers since 1870 of many products in Bronze,
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THE RECORD REPORTS

(*Continued from page 16*)

ON THE CALENDAR

December 2–7: 17th National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.

January 4, 1947: Meeting, North American Conference on Church Architecture, New York. For details address Director, Interdenominational Bureau of Architecture, 297 Fourth Ave., New York 10, N. Y.

January 9–11: Annual meeting, Louisiana Engineering Society, New Orleans.

January 14–17: First national Materials Handling Exposition, Public Auditorium, Cleveland, Ohio.

January 23–26: 2nd Conference and Exhibit, Low-Pressure Division, The Society of the Plastics Industry, Edgewater Beach Hotel, Chicago.

January 25–31: 3rd annual plastics show and convention, Society of Plastics Engineers, Navy Pier, Chicago. Technical meeting, Congress Hotel, Chicago, January 27–31 only.

January 27–30: 28th Annual Convention, The Associated General Contractors of America, Inc., Stevens Hotel, Chicago.

January 27–31: 7th International Heating and Ventilating Exposition, Lakeside Hall, Cleveland, Ohio.

January 27–31: Electrical Engineering Exposition, and Winter Convention, American Institute of Electrical Engineers, 71st Regiment Armory, New York City.

May 5–11: 2nd National Plastics Exposition and Annual Convention, The Society of the Plastics Industry, Coliseum, Chicago.

June 12–22: 2nd annual Construction Industries Exposition and Home Show, Pan-Pacific Auditorium, Los Angeles.

AT THE COLLEGES

Appointments

Six new instructors and professors have been added to the growing faculty of the School of Architecture, Syracuse University: George F. Earle, instructor of drawing, water color and industrial design; George Clayton, in charge of intermediate design, intermediate construction, and drawing; Milo D. Folley, in charge of design and drawing laboratory classes; Robert H. Snyder, instructor of elementary design and construction laboratory courses; Charles E. Croom, instructor in theory of structure; and Harley J. McKee, in charge of classes in history of architecture.

Nine resident critics in design have been added to the teaching staff of the School of Architecture, Columbia University: Don Hatch, architect; Percival

(*Continued on page 20*)

Jewelry Shop, Blum's Vogue, Chicago • Architects: Maher and McGrew, Evanston, one of the noted wood interiors produced at Woodwork Corporation

artistry in wood

Giving substance to the beautiful wood interiors that architects and decorators envision has been the function of Woodwork Corporation craftsmen for a good many years. A mentality that quickly grasps the architect's idea plus consummate skill with wood that renders the idea faithfully in the form of beautiful paneling, or perhaps in cabinets and cases which accentuate the quality of the merchandise they display, is characteristic of the Woodwork Corporation craftsman. Architects, decorators and clients appreciate this artistry in wood. That is why the high proficiency of Woodwork Corporation's skilled, experienced artisans is salient in the decor of many distinguished hotels, dining rooms, clubs, churches, smart coutouries, and retail establishments serving a discerning clientele.

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Just as a Jeweler selects a fine setting...

Veterans' Hospital, Bay Pines, St. Petersburg, Florida

CONCRETE CRAFTSMEN CHOOSE WHITE CEMENT

Colorful jewels sparkle and shine with full beauty in the proper setting. So, too, a matrix of Atlas White Cement sets off the color values of pigments and aggregates in Terrazzo, Stucco, Cement Paint and Architectural Concrete Slabs. Such a "setting" has the uniform clarity to complement the desired color overtones, whether in contrast or blend.

In addition, Atlas White, a true portland cement, provides protection against moisture and the wear of weather. Simple cleansing suffices. Maintenance costs stay low.

For further information write the Atlas White Bureau, Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

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FOR BEAUTY AND UTILITY
ATLAS WHITE CEMENT
FOR TERRAZZO, PAINT, SLABS, STUCCO

A UNIVERSAL ATLAS PRODUCT

"THE THEATRE GUILD ON THE AIR"—*Sponsored by U. S. Steel Sunday Evenings—ABC Network*

THE RECORD REPORTS

(Continued from page 18)

Goodman, winner of the Paris Prize in 1925; James Marshall Miller, who will direct the school's Planning and Housing Division; Charles Rieger, graduate French architect; Albert O. Halse, in charge of drawing and design techniques; Harvey Clarkson, LeBrun Traveling Fellow of 1938; Antonin Heythum, industrial and stage designer; John C. B. Moore, of the New York firm of Moore and Hutchins; and Wallace Sanders, of Sanders and Malsen. Theodore Rohdenberg has been appointed instructor in construction.

Professor Aubrey I. Brown has been appointed head of the Ohio State University department of mechanical engineering.

F. Ellis Johnson, former dean of the College of Engineering at both University of Missouri and the University of Wisconsin, has been appointed director of educational activities at the Hanford Engineer Works, Richland, Wash.

Walter A. Taylor, formerly associate professor of architecture at Syracuse University, has been appointed director of the new Department of Education and Research of the American Institute of Architects.

Harold D. Hauf, director of the Technical Branch of the NHA, has been recalled by Yale University to become acting chairman of the Department of Agriculture.

Pratt Faculty

Under the chairmanship of recently appointed Olindo Grossi, the Department of Architecture of Pratt Institute is now staffed by a new group of critics: Walter B. Sanders, C.I.A.M.; Philip C. Johnson, co-author of *The International Style*, and director of the Department of Architecture at the Museum of Modern Art, New York; Caleb Hornbostel, co-winner of the Wheaton College Competition and a member of the staff at Cooper Union, New York; St. Elmo Piza, formerly of the staff of New York University; William N. Breger, graduate in architecture, Harvard University. Mr. Lloyd Morgan will serve as visiting critic for the next senior problem.

Also on the new Pratt staff are Henry and William Eipel of Tuck & Eipel, Engineers, serving as consultant engineering critics on design problems, and Konrad F. Wittmann, instructor in town planning.

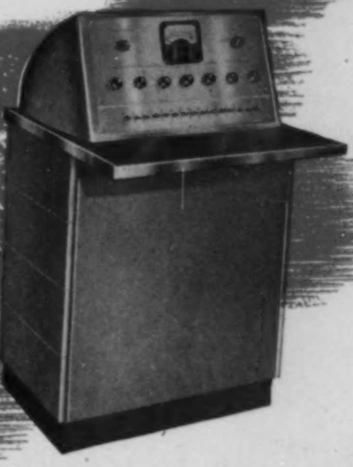
New Courses

At the School of Architecture, Columbia University, a new course has been inaugurated which is devoted to a study of management-tenant relations and the

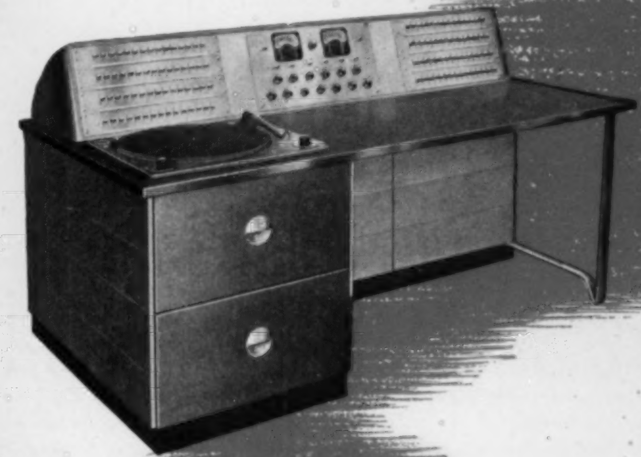
(Continued on page 136)

Unit-Built...

RCA MASTER SOUND CONTROL CONSOLES



Master Sound Control Console provides paging facilities to loudspeakers in 15 to 60 zones.



Master Sound Control Console with Record Transcription Unit and facilities for the distribution of speech and music to loudspeakers in 120 zones.

Master Sound Control Console with two Record Transcription Units, a Radio Receiver and paging facilities for distribution to 120 zones.

Whether your problem is sound distribution for a small paging installation or an elaborate plant broadcasting service—you can do it better with an RCA unit-built Master Sound Control Console.

A series of standardized frames and panels are matched to make up distinctly styled basic units. These matched units are so designed that it is possible to assemble them into any desired combination of unit-built Master Sound Control Consoles to fit the job.

No matter what your requirements—record transcription turntable, recorder, radio, or paging—so flexible is this equipment that the right combination of basic units can be provided to give you any or all of these services. As your sound-system needs develop, basic units can be added without discarding equipment already in use.

Built of "matched" units, RCA's Master Sound Control Equipment provides custom-built consoles within the price range of regular production-made equipment. You are assured of dependable performance at lower cost, for years to come.

For full information on the various *unit-built* combinations, write: Dept. 10-L, Sound Equipment Section, RCA, Camden, N. J.

SOUND SYSTEMS

RADIO CORPORATION of AMERICA

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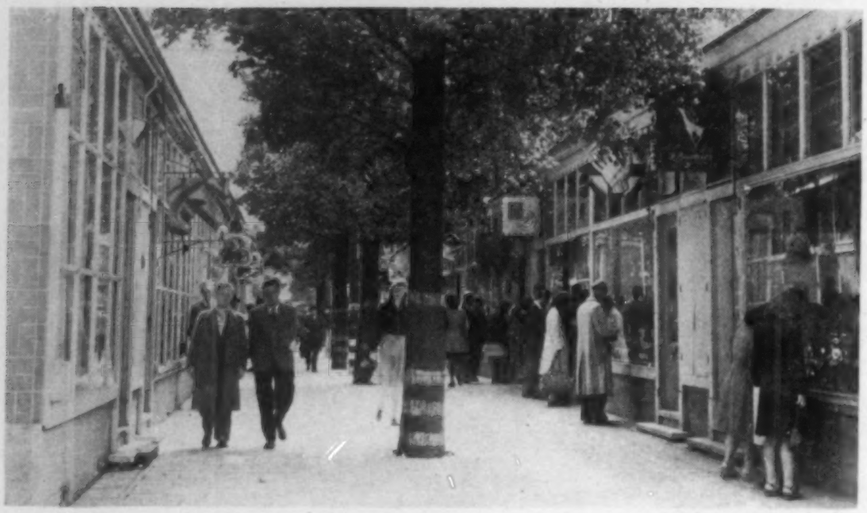


POSTCRIPT ON ROTTERDAM

As reported by Earle Draper in the October ARCHITECTURAL RECORD, the Netherlands city of Rotterdam wasted no time in drawing up plans for its rebuilding following the disastrous German air raid of 1940. Neither did it waste any time in putting those plans to work. Within a few weeks after the bombing, the municipality not only had acquired the entire central area of the city, which had been completely destroyed, but had expropriated neighboring areas and small villages as well.

The reasons for this bold annexation were explained by C. van Traa, city engineer, to a delegation of the British Townplanning Institute during its visit to Rotterdam in September.

"From the beginning," Mr. van Traa said, "it was clear that it would not be possible to reconstruct in the city all the buildings which we lost there.

"Why not? In the first place it was evident that the open spaces in the new city should be much wider than they were before the war as the open spaces inside the blocks were far below the minimum socially speaking.

"In the second place we wished more parks laid out in the town.

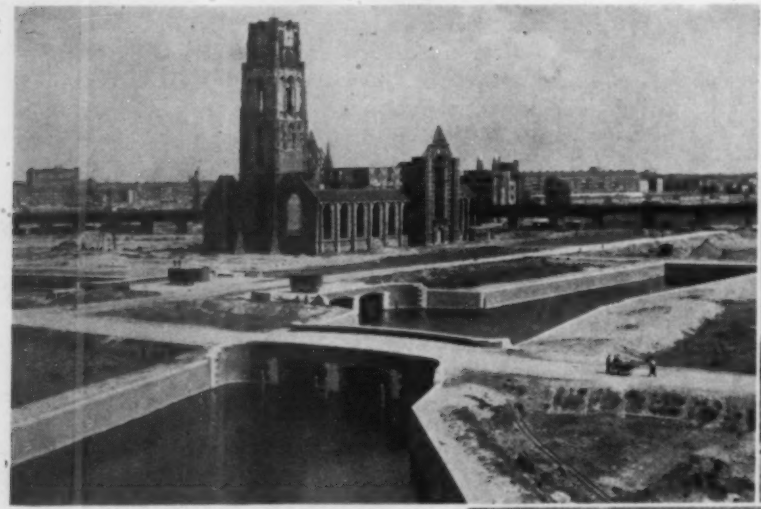
"In the third place it was necessary to reserve more space for the expected development of the traffic, especially for the main roads and for parking purposes.

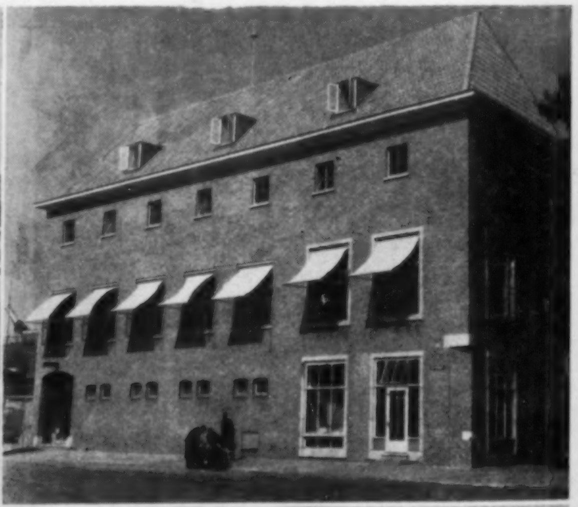
"In the fourth place we had to consider from a social point of view to enlarge the sites for the offices and the dwellings which had to be rebuilt.

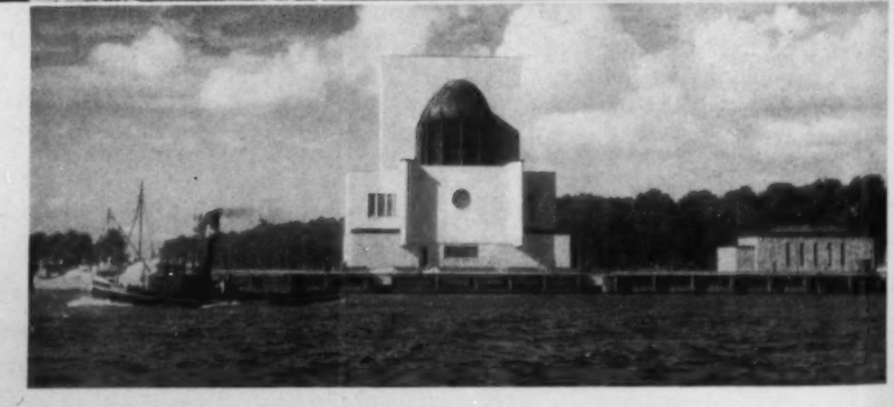
"All these considerations made it necessary to look for sites around the town to rebuild there that part of the inner town for which provisions could be made in these new surroundings.

"It is also evident that the factories which belong in a special district should leave the city. The same can be said of a great part of the dwellings which in the city never can have the social conditions they need and which therefore must be projected in special living quarters in the neighborhood of the town.

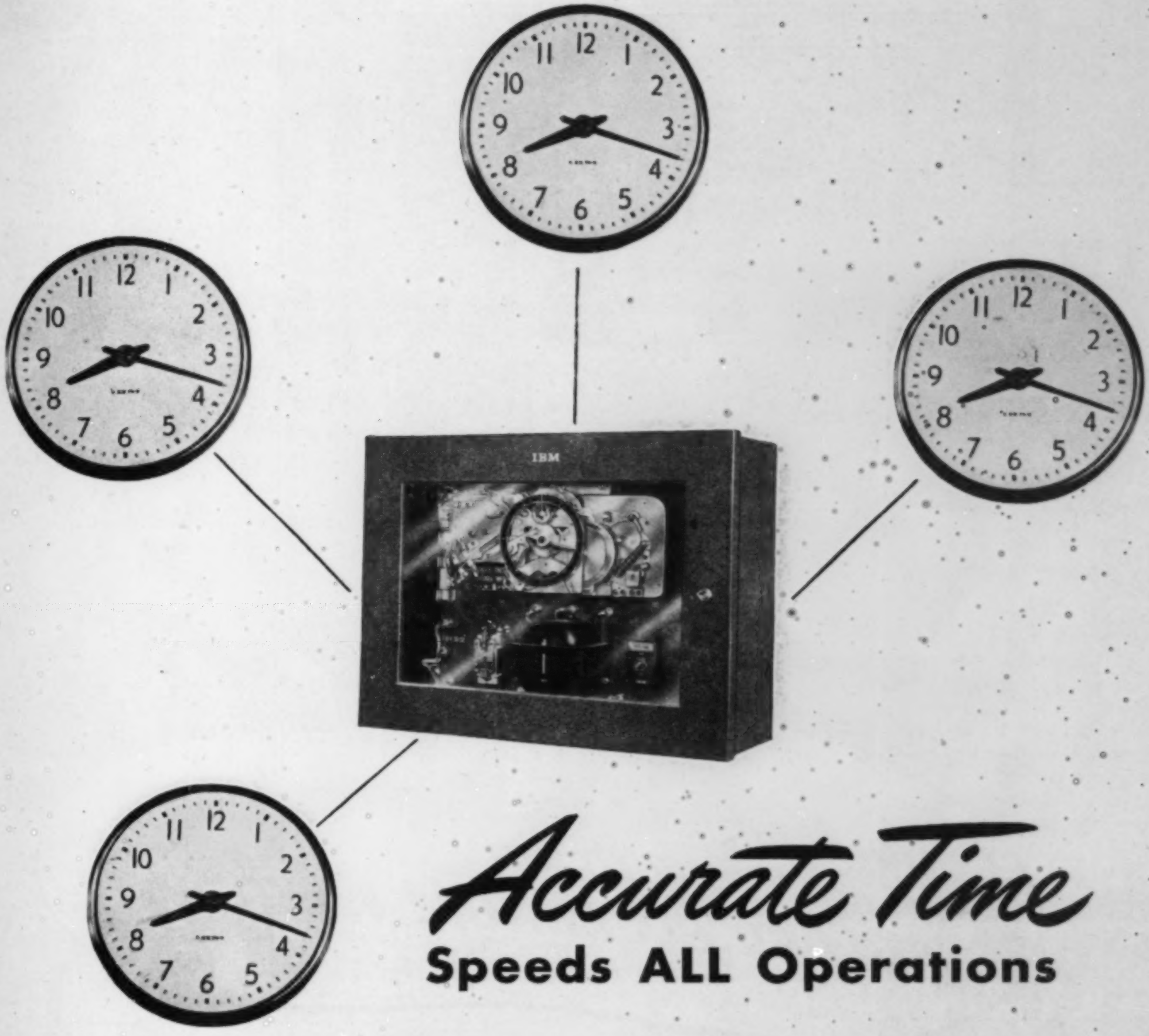
"To realize these ideas it was inevitable to expropriate certain areas in the neighborhood but belonging to independent municipalities and in order to get the desired influence on the development in the surrounding areas of the town we proceeded to the annexation of the smaller villages next to the town."







Rotterdam today: Top of page, temporary arcade with emergency shops, in front of General Post Office. Above, left, bridges over a new canal connecting the river Rotte with the Maas; badly damaged Groote Kerk in background. Above, right, the first new office building in the harbor quarter. At right, ventilation building of the 1070-meter tunnel under the Maas, completed during the war; main passenger entrance at extreme right of photo



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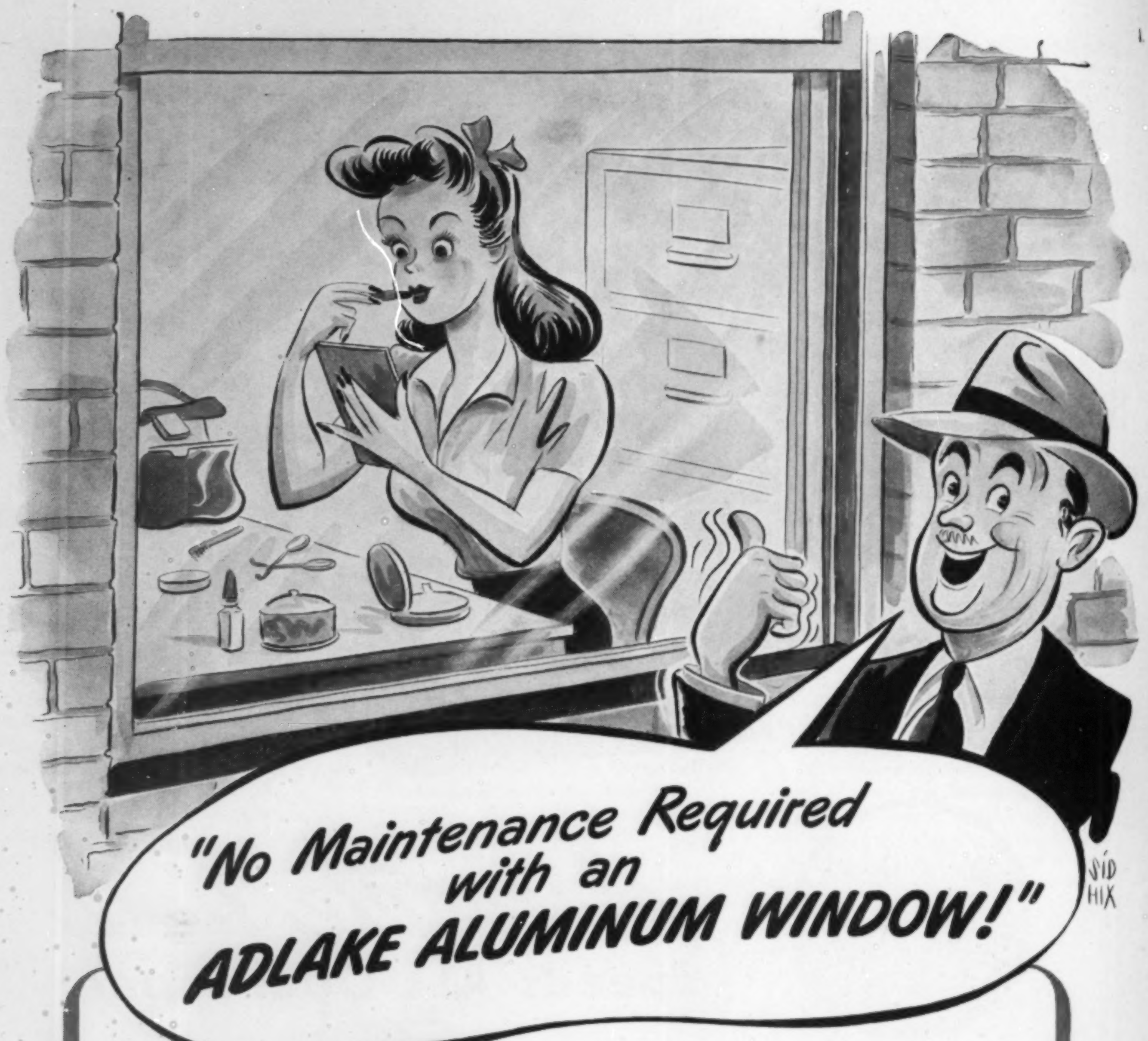
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UNITED STATES STEEL

CONSTRUCTION COST INDEXES — Labor and Materials

United States average 1926 — 1929 = 100

Compiled by Clyde Shute, manager, Statistical and Research Division, F. W. Dodge Corporation, from data collected by E. H. Boeckh & Associates, Inc.

	NEW YORK					ATLANTA				
	Residential		*Apts., Hotels, Office Bldgs.*	*Commercial and Factory Buildings*		*Residential*		*Apts., Hotels, Office Bldgs.*	*Commercial and Factory Buildings*	
Period	*Brick*	*Frame*	*Brick and Concr.*	*Brick and Concr.*	*Brick and Steel*	*Brick*	*Frame*	*Brick and Concr.*	*Brick and Concr.*	*Brick and Steel*
1920	136.1	136.9	123.3	123.6	122.6	122.8	122.9	108.6	109.8	105.7
1925	121.5	122.8	111.4	113.3	110.3	86.4	85.0	88.6	92.5	83.4
1930	127.0	126.7	124.1	128.0	123.6	82.1	80.9	84.5	86.1	83.6
1935	93.8	91.3	104.7	108.5	105.5	72.3	67.9	84.0	87.1	85.1
1939	123.5	122.4	130.7	133.4	130.1	86.3	83.1	95.1	97.4	94.7
1940	126.3	125.1	132.2	135.1	131.4	91.0	89.0	96.9	98.5	97.5
1941	134.5	135.1	135.1	137.2	134.5	97.5	96.1	99.9	101.4	100.8
1942	139.1	140.7	137.9	139.3	137.1	102.8	102.5	104.4	104.9	105.1
1943	142.5	144.5	140.2	141.7	139.0	109.2	109.8	108.5	108.1	108.7
1944	153.1	154.3	149.6	152.6	149.6	123.2	124.5	117.3	117.2	118.2
1945	160.5	161.7	156.3	158.0	155.4	132.1	133.9	123.2	122.8	123.3
Jan. 1946	173.1	173.7	169.8	170.4	167.0	137.9	138.4	127.4	127.3	127.0
Mar. 1946	174.9	175.6	172.1	172.9	169.0	141.2	143.0	133.6	129.3	129.3
May 1946	180.3	180.6	177.4	179.3	174.7	144.7	147.2	133.2	131.0	131.3
June 1946	180.7	181.0	177.9	179.7	175.1	144.9	147.4	133.5	131.2	131.5
July 1946	181.3	181.6	178.6	180.3	175.6	148.6	150.2	138.6	137.0	135.5
Aug. 1946	185.6	186.0	180.0	181.5	177.3	152.4	153.3	141.2	141.3	137.5
Sept. 1946	187.1	187.4	181.5	184.5	179.5	154.5	155.4	142.6	144.4	141.8
	% increase over 1939					*% increase over 1939*				
Sept. 1946	**51.5**	**53.1**	**38.8**	**38.3**	**37.9**	**79.1**	**86.9**	**49.9**	**48.3**	**49.7**

	ST. LOUIS					SAN FRANCISCO				
1920	118.1	121.1	112.1	110.7	113.1	108.8	107.5	115.2	115.1	122.1
1925	118.6	118.4	116.3	118.1	114.4	91.0	86.5	99.5	102.1	98.0
1930	108.9	108.3	112.4	115.3	111.3	90.8	86.8	100.4	104.9	100.4
1935	95.1	90.1	104.1	108.3	105.4	89.5	84.5	96.4	103.7	99.7
1939	110.2	107.0	118.7	119.8	119.0	105.6	99.3	117.4	121.9	116.5
1940	112.6	110.1	119.3	120.3	119.4	106.4	101.2	116.3	120.1	115.5
1941	118.8	118.0	121.2	121.7	122.2	116.3	112.9	120.5	123.4	124.3
1942	124.5	123.3	126.9	128.6	126.9	123.6	120.1	127.5	129.3	130.8
1943	128.2	126.4	131.2	133.3	130.3	131.3	127.7	133.2	136.6	136.3
1944	138.4	138.4	135.7	136.7	136.6	139.4	137.1	139.4	142.0	142.4
1945	152.8	152.3	146.2	148.5	145.6	146.2	144.3	144.5	146.8	147.9
Jan. 1946	157.7	158.3	150.8	152.6	149.5	148.6	146.4	146.7	148.3	149.3
Mar. 1946	158.8	159.5	151.1	152.8	149.9	154.0	153.0	151.8	151.8	152.3
May 1946	162.2	163.0	154.3	155.8	153.1	157.6	156.1	155.7	156.5	156.2
June 1946	165.8	165.0	159.9	163.8	159.5	158.0	156.5	156.2	156.9	156.6
July 1946	167.8	167.7	161.9	164.8	160.8	159.0	157.5	158.7	158.7	160.1
Aug. 1946	172.5	172.7	164.0	166.2	162.9	163.5	164.0	160.6	159.3	161.5
Sept. 1946	173.7	174.0	164.9	166.7	164.3	165.8	162.9	164.0	167.0	168.0
	% increase over 1939					*% increase over 1939*				
Sept. 1946	**57.6**	**62.6**	**39.0**	**39.2**	**38.0**	**57.1**	**64.1**	**39.6**	**37.0**	**44.2**

The index numbers shown are for combined material and labor costs. The indexes for each separate type of construction relate to the United States average for 1926–29 for that particular type — considered 100.

Cost comparisons, as percentage differences for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.:

index for city A = 110
index for city B = 95

(both indexes must be for the same type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

$$\frac{110-95}{95} = 0.158$$

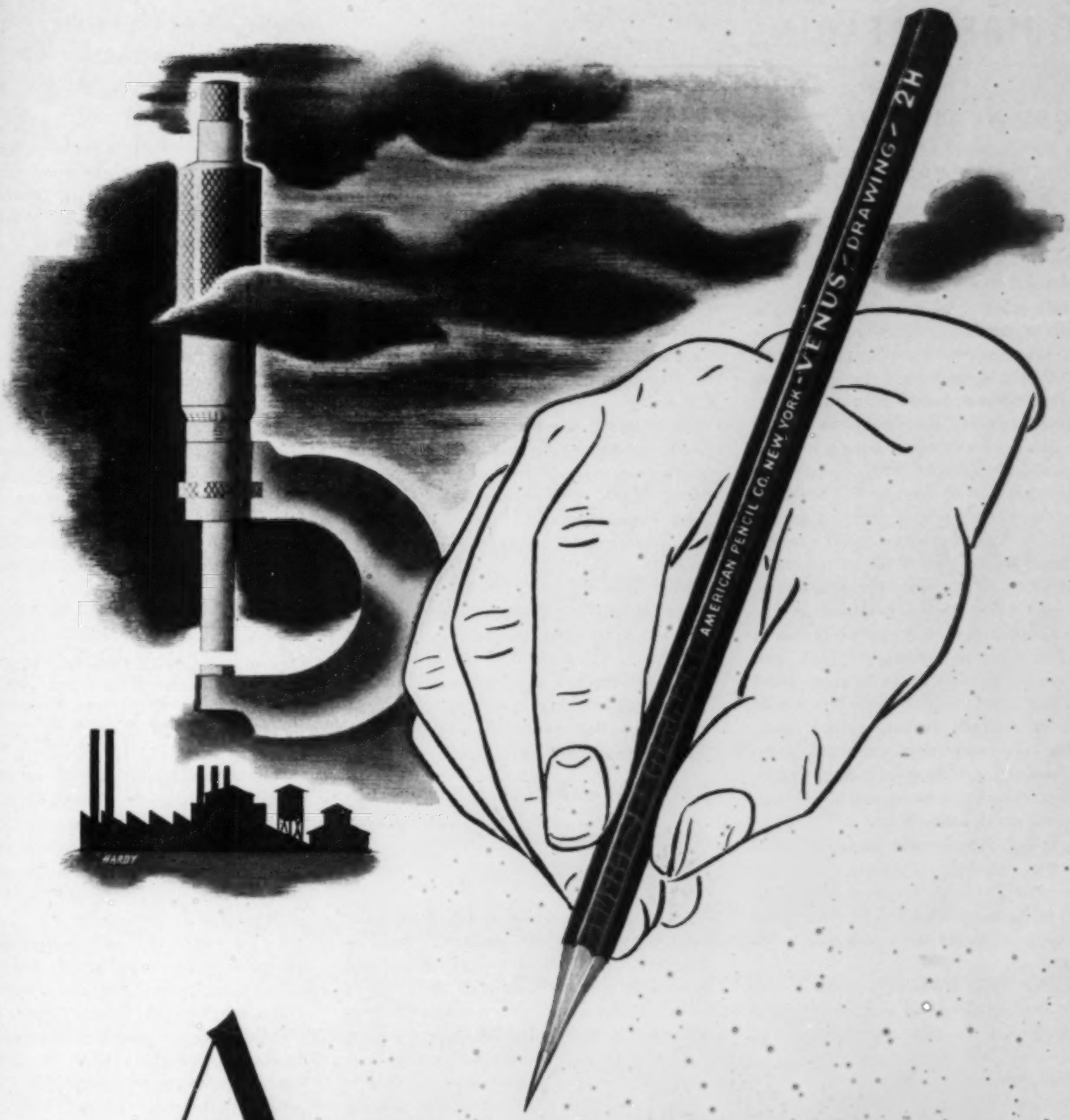
Conversely: costs in B are approximately 14 per cent lower than in A.

$$\frac{110-95}{110} = 0.136$$

Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926–29.

Material prices and wage rates used in the current indexes make no allowance for payments in excess of published legal prices, thus, indexes reflect minimum costs and not necessarily actual costs.

These index numbers will appear whenever changes are significant.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REQUIRED READING

INFORMAL LIVING

Sunset Western Ranch Houses. By the Editorial Staff of Sunset Magazine, in collaboration with Cliff May. San Francisco, Calif., Lane Publishing Co., 1946. 7¾ by 10½ in. 160 pp. illus. $3.00.

"Almost any house that provides for an informal type of living and is not definitely marked by unmistakable style symbols is called a *ranch house.*" Such is the premise, stated immediately in the introduction, upon which this collection of widely diverse house plans has been based. Informality, low roof lines, generous provision for outdoor living, are the common denominators of the group.

Following a lively history of the ranch house, the editors plunge into an analysis of the special needs that such a house is planned to fill, and of the advantages that it offers. Over and over again they stress one point: that a house must *live* like a ranch house to be properly called one. The close-to-the-ground look and the wide porch may be hallmarks of the type, but they do not type the house unless it actually is on ground level, opening out conveniently toward patio and garden, and its porch is properly secluded. So all the houses in this book, large and small alike, feature "built in" landscaping. Not formal planting, mind you, but casual, of-the-earth-earthy lawns and gardens, trees and shrubs, patios and courts. One landscaping plan even calls solemnly for weeds and wildflowers!

A curious, not too happy idiosyncrasy of this book is the total lack of architect credit except for an alphabetical list on the very last page. Consulting this, however, one finds such well known architects as Van Evera Bailey, Mario Corbett, Gardner A. Dailey, Michael Goodman, Frederick H. Reimers, and Wurster, Bernardi and Emmons represented in the ranch house hierarchy.

INTERIORS

Interior Decoration for Today and Tomorrow. By Walter Murray. Hollywood 28, Calif., Murray & Gee, Inc., 1946. 8½ by 11 in. 96 pp. illus. $2.50.

"Today's trend in house planning," says Architect Paul R. Williams in the introduction to Mr. Murray's book, "is based on the premise that every inch of space must serve to the utmost, and that every dollar spent must purchase utility as well as beauty. But skillful planning alone is not enough. Every bit as much care must be given to the problem of interior decoration if today's house is to be functional as well as beautiful and still fall within reach of the average budget."

The average budget, however, has an unexpectedly long reach if it encompasses interiors such as presented by Mr. Murray here. Mrs. Average Housewife, in fact, probably would drool with envy at the budgetary implications of many of the photos. Yet she would find a good number of thoroughly practical suggestions, too, which she could adopt without too much financial difficulty.

Like most books on interior decoration, this one has do-and-don't lists, buying guideposts, color schemes, tips on window treatments, furniture, and so on. It offers a number of color schemes for various rooms, some of which are rather more startling than practical (such as one living room scheme with chartreuse rug, black-bordered waxed floors, black woodwork with accents in coral, bisque walls, lipstick red draperies, red-violet and grayed-blue upholstery, and lemon yellow lamps). And it offers the traditional list of decorating principles. It does not, however, concern itself with furniture refinishing, drapery and slip-cover making, and other money-saving home decorating considerations. It is a book, in other words, for those members of the carriage trade whose hearts are young and gay.

POCKET EDITIONS

(1) An Outline of European Architecture, by Nikolaus Pevsner; (2) An Introduction to Modern Architecture, by J. M. Richards; (3) Town Planning, by Thomas Sharp.

It is pleasant indeed to see these three important volumes reduced to the Penguin level of size and price and geared to a wider public. None of them is an abridged edition, even the illustrations being faithfully included.

Of the three, the only one which may not be familiar to American readers is the first, published in England during the war (1943). This is a thorough-going history of European architecture, starting with the 6th Century and running through to the present. Indicative of its sensitive approach to its subject is the author's statement in his introduction that "architecture is not the product of materials and purposes . . . but of the changing spirits of changing ages. It is the spirit of an age that pervades its social life, its religion, its scholarship and its arts. The Gothic style was not created because somebody invented rib-vaulting. The Gothic spirit existed and expressed itself in rib-vaults . . . before the constructional possibilities of the rib had been discovered. The Modern Movement did not come into being because steel frame and reinforced concrete construction had been worked out — they were worked out because a new spirit required them." That is the kernel of Mr. Pevsner's study: not what was built, but why it was built as it was, is his chief concern, his constant emphasis.

PREFABRICATION

Prefabrication in Building. By Richard Sheppard, F.R.I.B.A. London, Eng., The Architectural Press, 1946. 7¼ by 9½ in. 148 pp. illus. 18s. 6d.

The stress laid upon prefabrication by the almost universal housing shortage has produced a number of treatises on mass building, not the least of which is this small book from England.

Architect Sheppard has not written a history of prefabrication, but an analysis of its accomplishments and its potentialities. He discusses the various materials used — steel, wood, concrete — and their individual characteristics. He describes the techniques in common usage in England, the United States, and on the continent of Europe. He points out the site-planning peculiarities, the successes and the failures of prefab "colonies." And he shows how prefabrication is affecting, and is likely to affect, building practice in the industry as a whole.

CITY PLANNING

City and Regional Planning Papers. By Alfred Bettman. Edited by Arthur C. Comey. Cambridge, Mass., Harvard Univ. Press, 1946. 6¾ by 7½ in. 20 + 294 pp. $4.50.

The astonishing thing about this collection of papers by Alfred Bettman is their continuing timeliness. Written from 1917 to 1945, they sound, for the most part, as immediate as the morning newspaper.

A lawyer by profession, Mr. Bettman was for many years a leader in civic planning, addressing group after group of laymen, technicians and officials, and publishing paper after paper on the methods and precepts of planning. Following his death in 1945, his addresses and articles were assembled by Mr. Comey into this volume. Unlike most such collections, it makes good consecutive reading, and is a surprisingly complete coverage of planning problems. Here is a valuable addition to the literature of city planning.

DETROIT

The People of Detroit. Detroit, Mich., City Plan Commission, 1946. 8½ by 11 in. 52 pp. illus.

Following a careful study of the population trends in their own city, the City Planning Commission of Detroit has come up with a handful of general conclusions, among them:

"Almost two-thirds of the nation's people are now living in urban communities in small or large cities or their suburbs.

"A far-reaching consequence of this urban trend has been a declining birth rate which has brought the total national population close to numerical stability.

(*Continued on page 30*)

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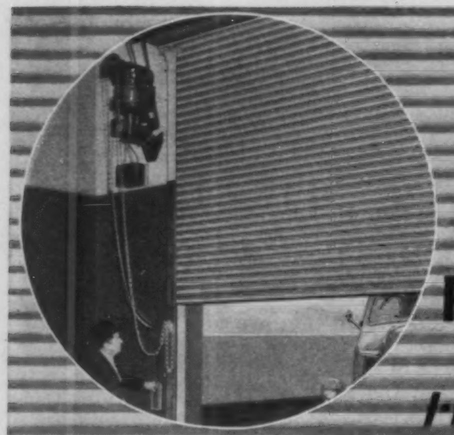

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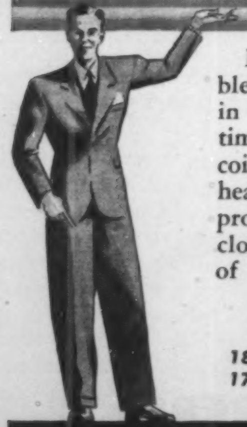

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REQUIRED READING

(*Continued from page 28*)

"Increased economic security and better living conditions for people who live in cities are essential to a sound national population policy."

As for Detroit itself, the Commission predicts limitation of total employment in the area to 1,200,000 and total population to 3,000,000. The declining birth rate, it finds, has resulted in an increase in the proportion of older persons in the population, and the cumulative effect of this shifting age distribution is to lower the number of possible births in the future. "The provision of a variety of building types and dwelling sizes within each community," the Commission concludes, "is necessary if families are to be accommodated over a full life cycle in any community, and the population of each community stabilized with a normal cross-section of ages."

Technical Books

DESIGNED FOR WELDING

Manual of Design for Arc Welded Steel Structures. Compiled by LaMotte Grover. New York 17 (60 E. 42nd St.), Air Reduction Sales Co., Dept. MD, 1946. 6 by 9 in. xiv + 282 pp. illus. $2.00.

Liberally illustrated and concisely put together, this manual offers much useful, up-to-date information on the fundamentals of design, materials, inspection, estimating, and engineering control of welding and related operations. Chapters are included on electrode requirements, specifications for welded connections for all sizes of rolled beams, and a series of diagrams for the rapid design of welded connections. The book is based largely upon standards of the American Welding Society, the American Institute of Steel Construction, and on reports of the Welding Research Council of the Engineering Foundation.

"PAINT BIBLE"

Physical and Chemical Examination of Paints, Varnishes, Lacquers and Colors. By Henry A. Gardner and G. G. Sward. 10th ed. Bethesda, Md. (4723 Elm St.), Henry A. Gardner Laboratory, Inc., 1946. 10½ by 11¾ in. 652 pp.

Once again the "Paint Bible" has been completely revised and considerably enlarged. New material in this 10th edition includes charts of colors widely used by the Army and Navy, and a presentation of new, still experimental methods of production and processing. Also included are the latest methods of measuring light reflection and matching colors, Army and Navy recommendations for camouflage, wearability of colors, and hiding power. The size of the volume has been changed for more convenient handling.

ARCHITECTURAL

RECORD

MUCH TO DO ABOUT HOUSING

Taking the lid off material and labor costs doesn't solve all our housing problems, emergency, veterans or long range. But it is a mighty step in the right direction, and it seems bound to insure increased production of scarce building materials — the No. 1 bottleneck of housing, and of all building. With price and wage ceilings off, house-price ceilings can't remain long in force without creating a work-stoppage, for no builders will undertake new ventures in such a squeeze. So the $10,000 ceiling seems next to go (we jumped the gun in last month's editorial). The same reasoning will bring about a relaxation of rent controls on new dwellings. Mr. Taft is quoted as stating that it may be possible to remove rent controls next February or March, though he feels they should not be lifted at present.

The fact that good dwelling units cannot be built at the $10,000 figure in many sections of the country, and that new dwellings must be priced beyond the reach or desire of most veterans, may well bring about the belated realization of the fact that our economy demands the production of housing for *all* citizens. Certainly veterans should not be saddled with houses built at peak prices, especially as the majority prefer and need rental housing.

It is heartening to learn that Wilson Wyatt is now, at last, turning his major attention to "new devices to provide rental homes and apartments to offset the expected rise in building costs," and that "some new aids to private financing may be asked either as an amendment to the pending housing bill * or as separate legislation." We believe that separate legislation is preferable and can be more effective in a shorter time than amendments tacked on to a debatable and once-shelved bill.

Private financing can hardly be induced to enter the rental-housing-market in any quantity as long as rent controls are unrelated to building and operating costs. The removal of the present stagnating rent ceilings on new construction would seem to be the first "aid" to private financing. The incentive of possible profit is essential to apartment house production.

The progress and prosperity of the whole building industry is dependent on the speed with which steps are taken to view the housing problem realistically and constructively. Estimates of the construction volume for 1947 are based on the present trend. The change from emphasis on restrictions to emphasis on encouragement and production augurs well for the future. Before construction in all needed categories (the hundreds of projects now on the architects' boards) can proceed at full speed there is, therefore, much to do about housing.

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*For a discussion of this bill ,see ''Political Housing—A Route to Inflation,'' by Thomas S. Holden, ARCHITECTURAL RECORD, October 1946.

Kenneth K. Stowell
EDITOR

CONSTRUCTION OUTLOOK FOR 1947

By Thomas S. Holden
President, F. W. Dodge Corporation
and Clyde Shute
Assistant Vice President and Manager, Statistical and Research Division

Potential construction demand is probably greater than the 1947 capacity of the construction industry. Since the industry's capacity, particularly in the material supply sector, has increased greatly in 1946, the obvious expectation is for a substantial increase in total volume during the coming year.

This expectation could fail of realization if construction costs continue to rise so rapidly as to price vast numbers of planned projects out of the market. It could, presumably, fail of realization if there should be a nation-wide wave of work stoppages in basic industries and among the construction trades. Odds are that neither of these possible deterrents will develop on a sufficiently serious scale to force any substantial or prolonged curtailment of construction volume.

In the present situation the general economic conditions surrounding construction activity and the types of stresses and strains likely to prevail within the industry, are even more important for appraising the outlook for the coming year than are any attempted measures of construction demand.

Price decontrol and restoration of free markets were announced by the President on November 9.

In each important group of commodities there is apt to be a short spell of price confusion, followed by a degree of stabilization. For most commodities in short supply the typical pattern followed after decontrol is a sudden rise in prices above OPA ceilings to levels less than, or sometimes equal to, previous black market prices, followed quickly by stepped-up production, increased supply and a price recession from the peak.

The current general rise in commodity prices is likely to reach a peak and start receding during the first quarter of 1947. Wholesale prices of farm products have already softened. A number of consumer items have been selling below retail price ceilings.

Wholesale prices of foods, textiles and other consumer goods are likely to reach a peak and turn down sooner than construction materials and other durable goods.

The U. S. Bureau of Labor Statistics index of wholesale prices of all commodities stood at 128.4 on August 24, at 134.8 on November 2. There was a minor downswing between those dates. Apparently, the index will be subject to more fluctuations until some degree of stabilization is reached. At the peak it may stand somewhere from 140 to 145. At such a point, the peak would be between 80 and 85 per cent over the average for 1939, which was 77.1. During World War I, the general wholesale price index more than doubled, and reached at the postwar peak in May 1920 a point nearly two and a half times the prewar level.

Since the general price rise this time has been so very much less than it was in the World War I period, the danger of general collapse of prices and serious business recession this time is correspondingly less. The more likely prospect this time is for more orderly price adjustment with only a moderate amount of confusion and a moderate decline of the index.

Threats of strikes in key industries are a disturbing factor as this is being written. Further wage increases would tend to boost prices above present levels; serious work stoppages curtailing production would prolong the unbalance of demand and supply in important commodities. However, neither wage increases as large as those of the past year nor prolonged work stoppages are likely. Labor disturbances in 1947 will probably have less effect on the general price structure and the general business picture than they had in 1946.

The anticipated price recession will probably be accompanied by a mild or only moderately serious recession in general business activity. Total industrial production may be in a moderately declining phase during a part of next year, and there may be a moderate decline in total employment.

In short, postwar readjustment will continue through a considerable part of 1947, relative stabilization of the general price level will probably be achieved, and the stage should be set for full postwar recovery after next

ESTIMATED CONTRACT VOLUME—MILLIONS OF DOLLARS

37 EASTERN STATES	Year 1946*	Estimate Year 1947	% Change
Commercial buildings	800	880	+ 10
Manufacturing buildings	1250	1070	− 14
Educational and science buildings	220	380	+ 73
Hospital and institutional buildings	130	150	+ 15
Public buildings	20	60	+200
Religious buildings	70	100	+ 43
Social and recreational buildings	95	120	+ 26
Miscellaneous nonresidential buildings	80	100	+ 25
TOTAL NONRESIDENTIAL BUILDINGS	2665	2860	+ 7
Apartment buildings, hotels and dormitories	540	1250	+132
One- and two-family houses	2800	3360	+ 20
Other shelter	15	15	—
TOTAL RESIDENTIAL BUILDINGS	3355	4625	+ 38
TOTAL BUILDING	6020	7485	+ 24
Public works and utilities	1725	2100	+ 22
TOTAL CONSTRUCTION	7745	9585	+ 24
Estimated dwelling units (37 states, basis of Dodge figures)	*465,000*	*630,000*	*+35*
48-state estimate (Basis of B. of L. S. figures)	*750,000*	*1,012,500*	*+35*

** 9 months actual, 3 months estimated*

year's principal adjustments have been completed.

Construction activity will not necessarily participate in the expected recession of general business. Odds are that it will not, but will continue on an increasing scale without serious setback. If this turns out to be true, construction may be the principal sustaining activity tending to moderate the impact of price recession on the general business structure. Construction could possibly share this moderating role with the automotive industry, another one with the tremendous backlog of unfilled demand.

Much depends upon relaxation of the numerous controls under which construction operated in 1946. Price controls on construction materials went out on November 9. In spite of the fact that the extraordinary powers granted the Housing Expediter under the Patman Act are not now scheduled to expire until December 31, 1947, it is likely that most controls will be out by March 31 at the latest. Rent control on existing structures may persist beyond that time. With material price and wage controls out, it would appear impossible to maintain ceiling prices on new houses. Priorities favoring housing projects over non-residential construction may be used for a while.

While credit must be given to the early accomplishment of the Housing Expediter in causing incentive prices to be granted by OPA and by this and other means stimulating production of critical materials and equipment items, housing activity has recently been hindered more than helped by administration of controls. Controls have been largely responsible for black markets, black market prices and many abnormal costs.

Removal of material price controls will stimulate increased production of many scarce items. It will probably result in numerous price increases, over present ceilings, but to levels lower than black market prices. Materials in approximately balanced supply will stabilize quickly. The few items that may show marked price increases will not necessarily count heavily in total construction costs. Construction costs will rise somewhat above present theoretical levels indicated by published index numbers, but will be measurably less than present actual costs. Elimination of the numerous abnormal costs engendered by controls will give the industry considerable leeway in adjusting itself to free-market conditions. Controls have been causing the industry, against its will, to price its product out of some of its markets. Elimination of controls will enable the industry to reduce that danger.

Most construction materials will progress from sellers' markets into buyers' markets during the course of next year and material supply will cease to be the major bottleneck. The major bottleneck will be shortage of skilled labor. While apprentice training has been stepped up, and many building trades unions have recruited new members, recruitment has not kept pace with needs in a number of important trades. Elimination of wage controls may bring demands for wage increases. However, top officials of the American Federation of Labor have already publicly stated the view that the cost-of-living rise has nearly reached its peak, and the view that increased labor efficiency is essential for increased production and for justification of the wage increases that have been gained. If this philosophy is accepted widely by local building trades unions, labor disturbances in the building trades should not reach serious proportions. Manpower shortages normally tend to much overtime pay, bonuses, and to low productivity, cost factors which must be measurably overcome if construction activity is to be sustained at expected levels.

If next year's general economic conditions turn out approximately as described above, the prospect would be for considerably greater increases in residential building than in nonresidential building or heavy engineering construction. This is likely to be true even with controls removed and even with preferential treatment for housing projects eliminated.

Although a number of important industrial corporations have plant expansion programs which have not yet been started, a reduced volume of manufacturing plant construction seems likely in 1947. The recent break in stock-market prices, the anticipated break in commodity prices, the possibility of a recession in general business activity, the prospect for narrow profit margins in the adjustment year and uncertainty as to the labor situation all tend to discourage aggressive expansion programs and to suggest postponement of decisions.

These factors also influence commercial building activity, for which a moderate increase is estimated.

In view of pressing needs for community improvement and the anticipated betterment of the supply situation, moderate increases over 1946 are estimated for the various classes of community, public and institutional buildings and for public works. An estimated marked increase in public utility construction reflects the great pressure of expansion needs in this field.

Odds Favor High Demand

While the prospect of general business recession has prompted talk of federal stimulation of public works, there is serious question as to whether such a course would be necessary or desirable. Odds favor continuation of effective private construction demand on such a scale as to make greatly enlarged public works programs unduly competitive for materials and labor in the 1947 market.

Residential building is estimated to increase 38 per cent in dollar volume over the final 1946 total. This estimate assumes an approximately uncontrolled market during most of 1947. The large estimated increase in apartments and hotels is predicated on the assumption that new construction will be completely exempted from rent ceilings. Rent ceilings have been and continue to be the principal deterrents to apartment building. It has been conclusively shown that increased supply of rental housing is the most urgent need in the whole housing shortage situation as it affects both veterans and nonveterans.

Individual investors planning to build or buy single-family houses are less apt to be deterred by temporarily unfavorable business conditions than are prospective investors in commercial or industrial projects. According to published index numbers, the construction cost of brick and concrete apartment and hotel type buildings was 42 per cent over the 1939 average in September of this year, brick houses were 60 per cent over prewar, and frame houses were 65 per cent over prewar. If such differentials as these persist after deflation of present abnormal cost factors, they will constitute a strong factor favorable to apartment house building.

The figures on dwelling units given in the table of estimates require some explanation.

F. W. Dodge Corporation's record shows for the 37 eastern states an overall total of 353,748 units contracted for during the first nine months of 1946. They include suites in apartment buildings, two-family houses, and in combination buildings, single-family houses (including those built on owners' order for owners' occupancy and those built for sale, or rent) and new suites created by conversion of existing buildings. They do not include demountable structures moved to new locations. These are all actual projects reported and verified by the Dodge field staff, and include no estimates.

The figure for the entire year 1946 (465,000) includes an estimate of units to be so reported and verified during the fourth quarter.

The 1947 figure (630,000) is an advance estimate of actual projects to be reported next year by the Dodge field staff. This indicates a 35 per cent advance in total units over 1946, compared with a 38 per cent estimated increase in dollar volume. It is estimated that unit costs of comparable buildings may average somewhat higher in 1947; also that more higher-quality, higher-priced units will be included in next year's programs (assuming relaxation, or removal, of ceilings and restrictions).

Translated into figures comparable with the 48 state figures regularly published by the U. S. Bureau of Labor Statistics our estimates give the following results: 750,000 units for this year; 1,000,000 units for 1947.

The current figures on dwelling units in the 48 states, published by the U. S. Bureau of Labor Statistics, consist of estimates based upon building permit records. There is no simple way of reconciling these estimates with the factual statistics recorded by Dodge.

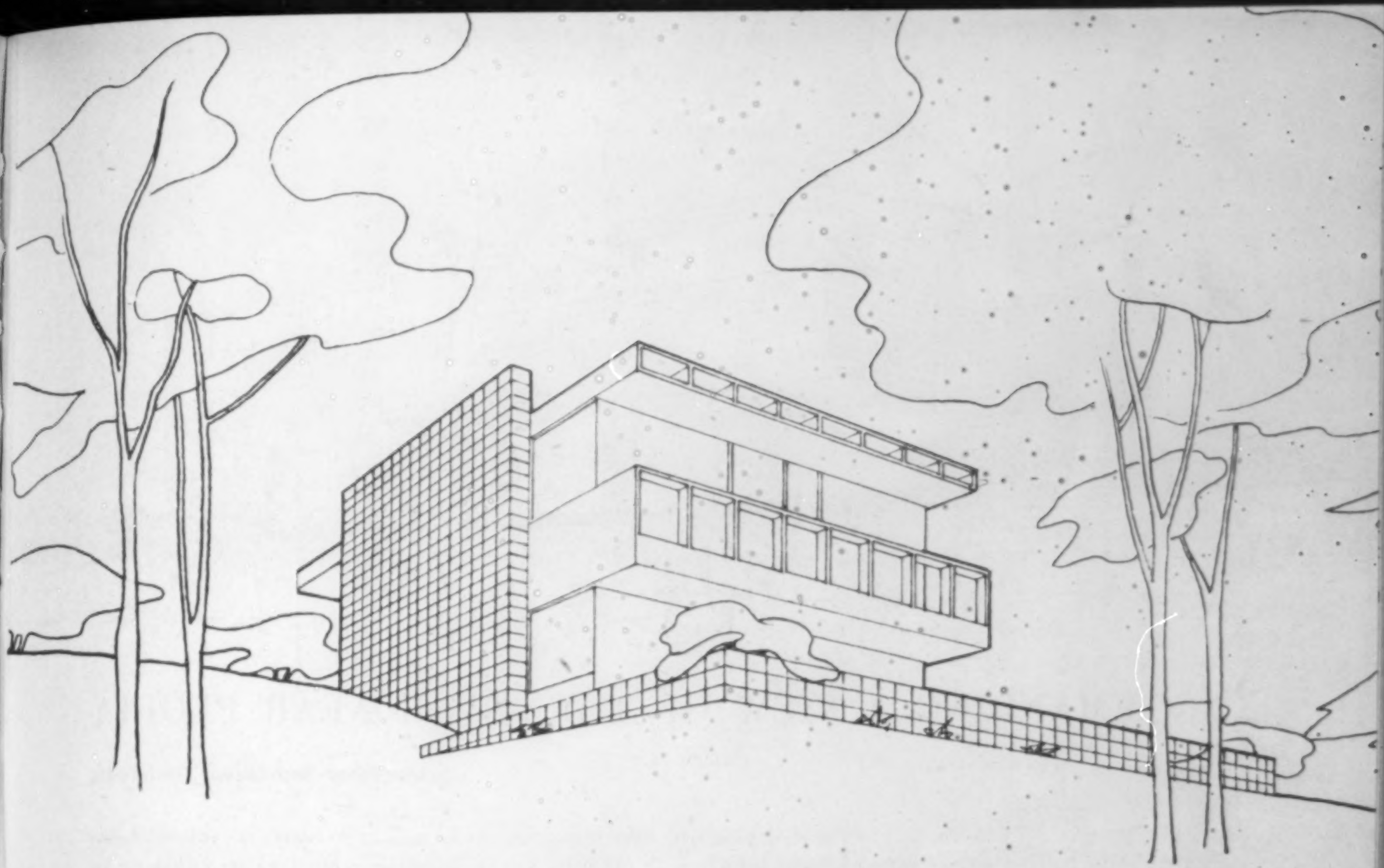
Housing Quota Will Not Be Reached

The conservatively estimated 1,000,000 units for 1947 obviously implies that the quota set for next year by the Housing Expediter will not be reached. If the 1946 quota of starts is made, it will have been done at the expense of stretching out completion time of most projects to double, or more than double, that ordinarily required. A sizable portion of next year's material supply will be required for completion of large numbers of residential and nonresidential projects started in 1946. Builders will want to make a better record on completions next year than has been possible in 1946, if they are to expand their operations.

These estimates have assumed that the few remaining controls will be out at an early date; they also assume that more housing will be built without controls than would have been the case if controls had been continued.

With recession in farm prices next year, total farm income is likely to decline; this would probably tend to reduce farm building volume, as compared with 1946. While there is still, in all probability, a very large backlog of needed repair and alteration work, it is likely to decline somewhat in total volume in 1947.

As usual, Dodge advance estimates aim to be conservative, in order to furnish what is believed to be a safe guide for production and sales planning by business organizations in the construction field.



PREVIEWS OF FOUR POSTWAR HOUSES

Hedrich-Blessing Photo

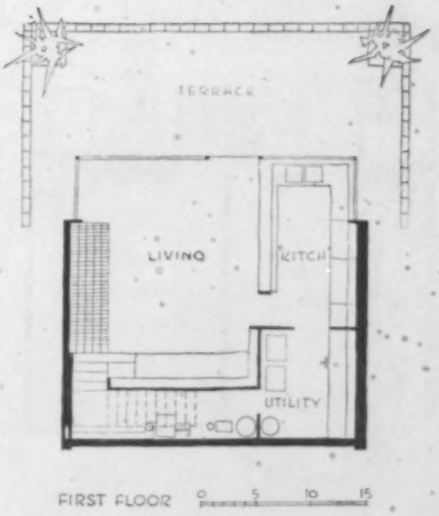
Paul Schweikher and Winston Elting

Schweikher and Elting, Architects

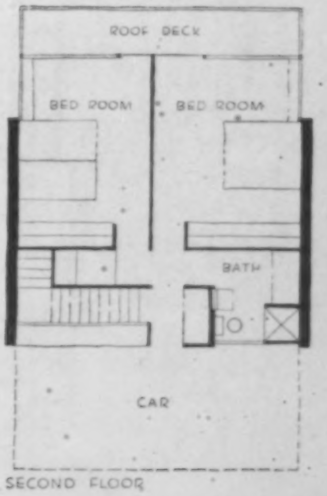
1. OVERLOOKING AN INDIANA LAKE

Designed for a young ex-naval officer and his wife, this compactly-spacious house takes full advantage of the lake view and the natural slope of the site. The economical construction is largely of reinforced concrete block and glass, with a "breathing" flat roof open at two ends. The utility room contains the heater, hot-water tank, well, pump, pressure tank, water-softener, and a long work bench.

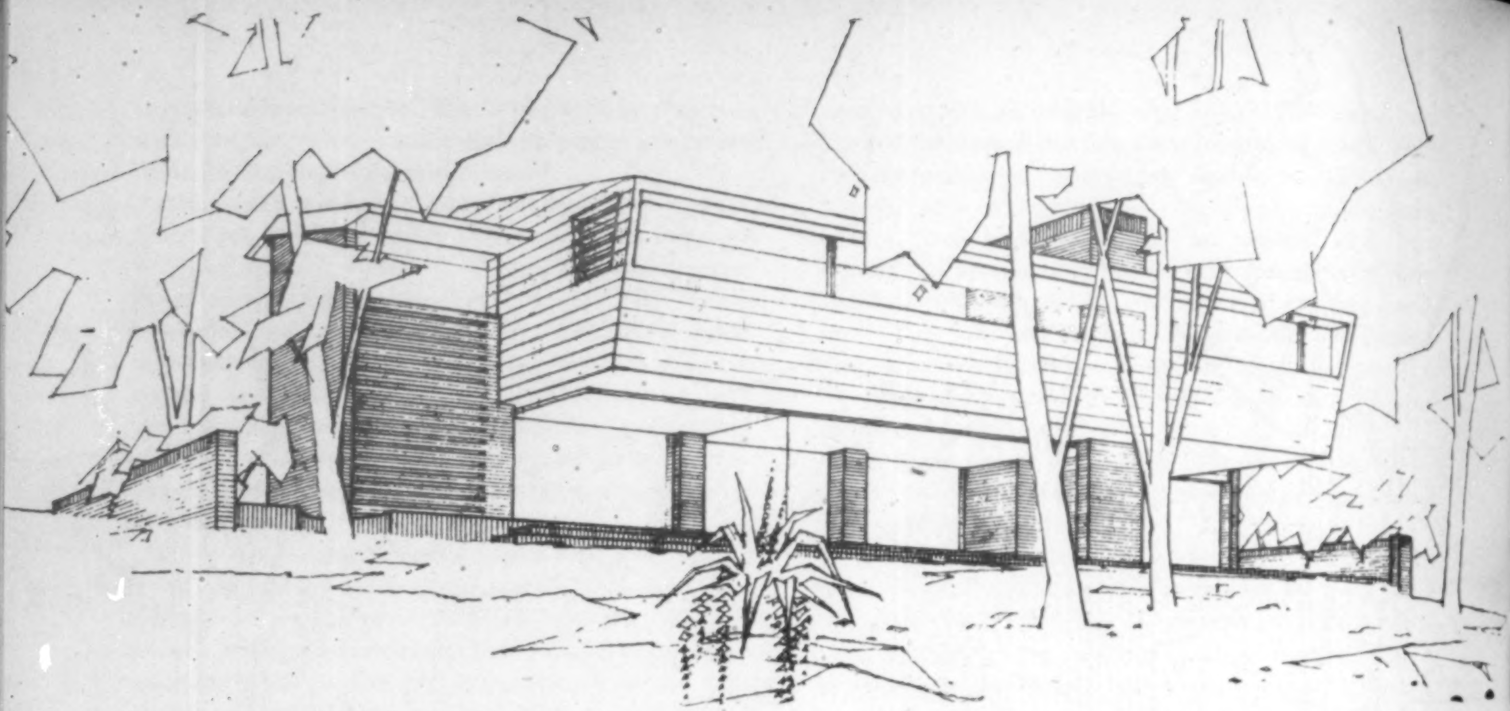
Out of their Navy uniforms but little more than a year, Schweikher and Elting have been working together on fresh solutions to age-old problems, using both new and old materials in ways calculated to meet the need and desires of forward-looking clients. . . . Paul Schweikher, born in Denver, studied art at Chicago's Art Institute and engineering at Armour. He received his architectural degree from Yale in 1929 and was awarded the Matcham Traveling Fellowship. His practice under his own name, with Theodore Lamb, began in 1933. . . . Winston Elting of Lake Forest received his architectural training at Princeton University and L'Ecole des Beaux Arts, Paris. After working in various architectural offices in Chicago, he began his own practice in 1937, and joined Schweikher and Lamb in 1940.



FIRST FLOOR



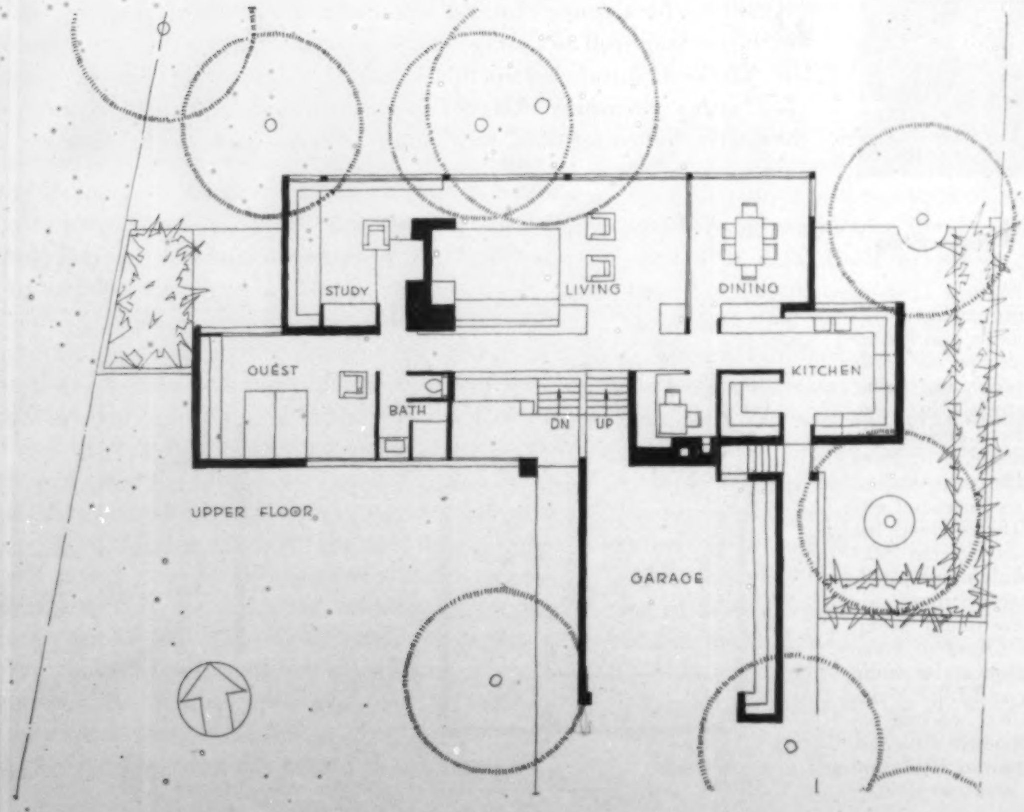
SECOND FLOOR

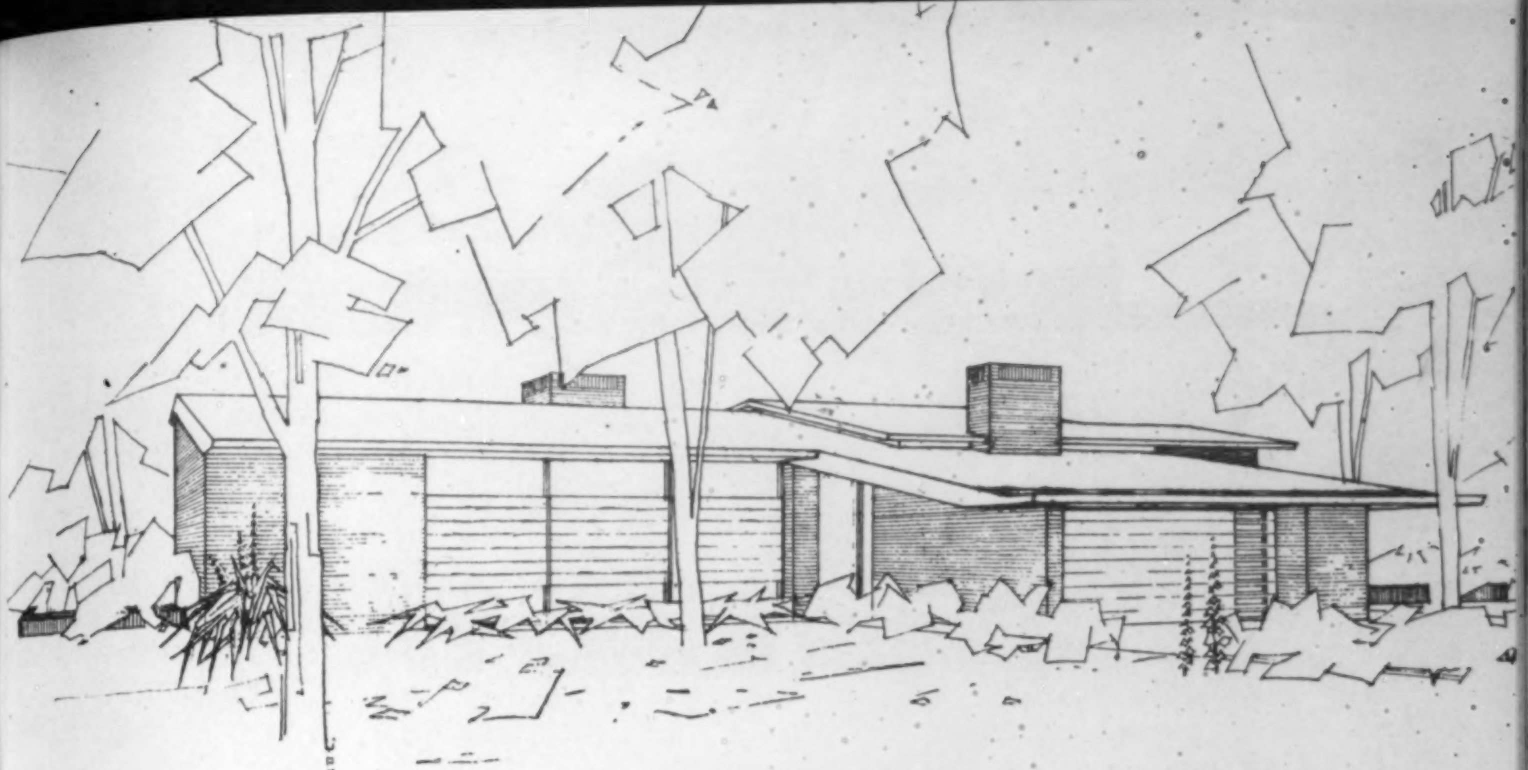


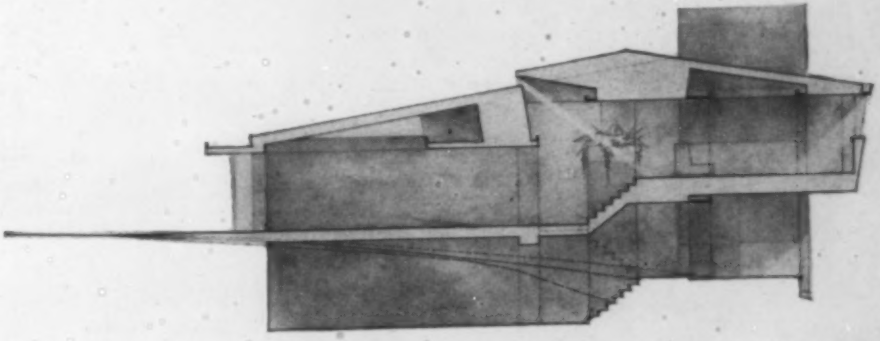
2. COMMANDING A VIEW OF THE RIVER NEAR PEORIA

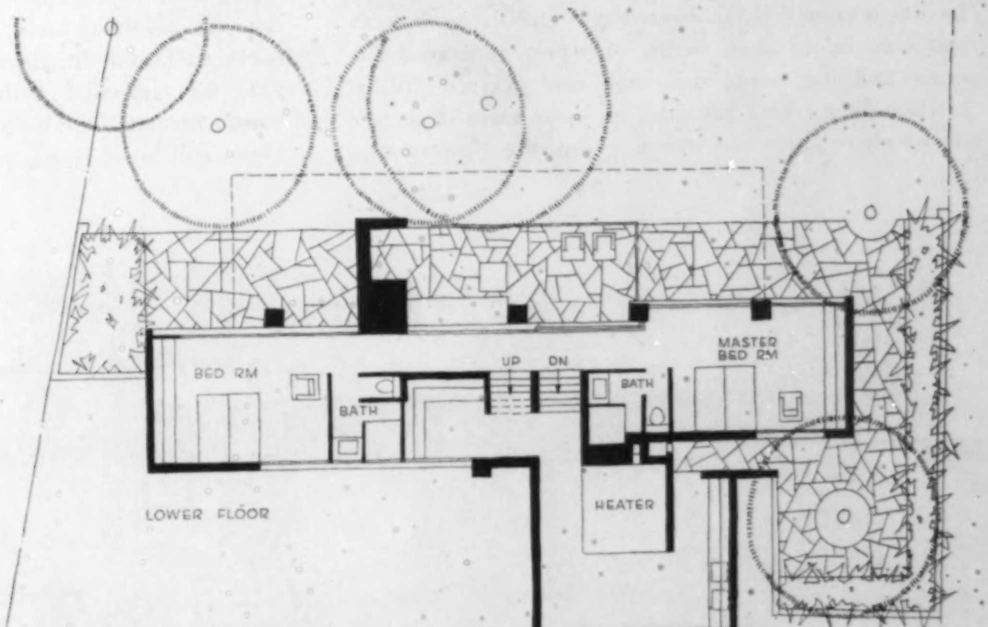
Schweikher and Elting, Architects

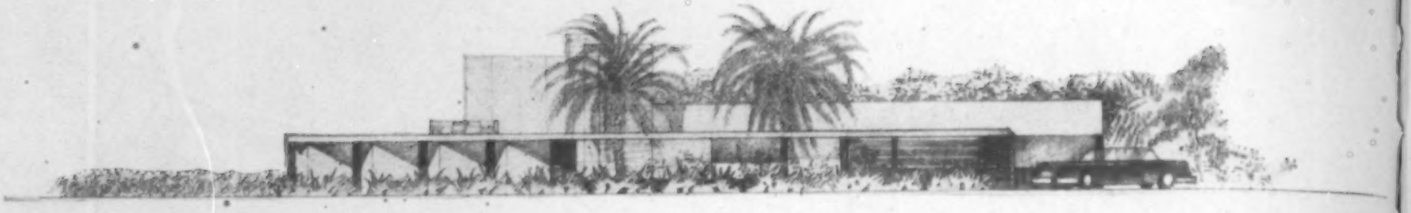
THAT sloping sites offer opportunities as well as problems is evident in this house which is so cleverly, yet so logically, related to its location. An ingenious split-level scheme provides the living room floor half a story above the entrance level, and the bedroom floor half a story down, as shown in section and plans. The basement is another half flight down and provides a required photographic darkroom as well as storage and the heater room. The owners' bedroom is adjacent to the study on the main living room floor and the two guest rooms on the lower floor open onto the terraces. The house is to be of California redwood inside and out, with local brick used for chimneys and retaining walls.

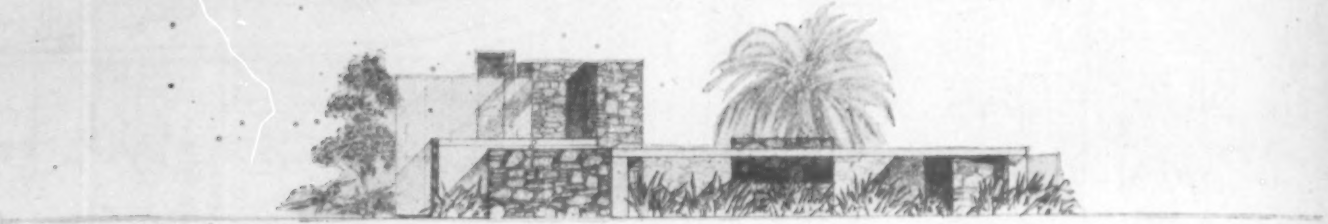






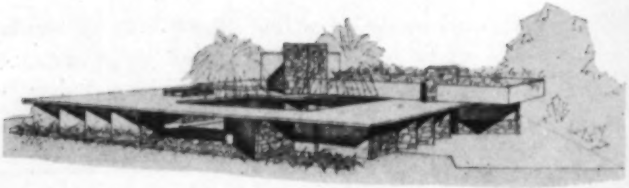

BED RM
BATH
UP
DN
BATH
MASTER BED RM
HEATER
LOWER FLOOR
0 5 10 15 20



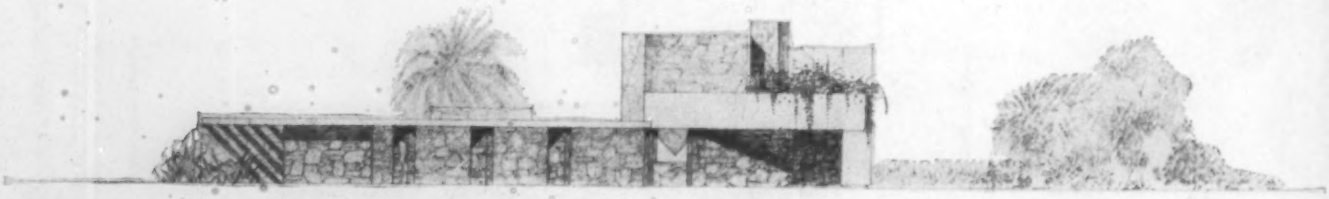


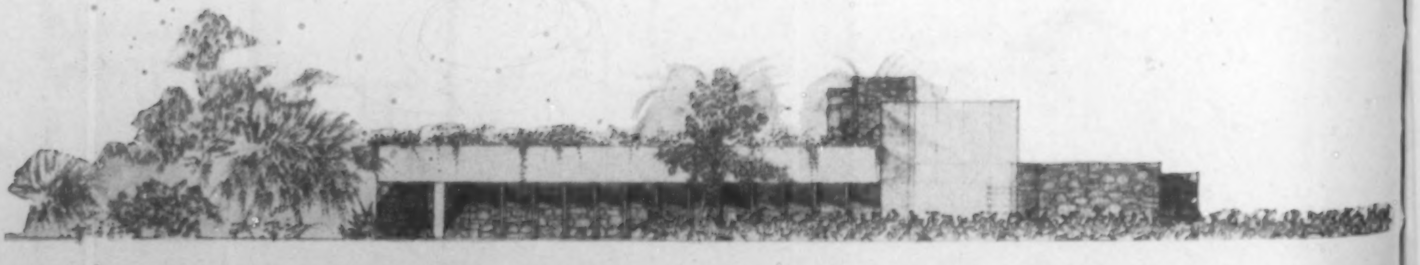
3. AN OASIS IN PARADISE VALLEY, ARIZONA

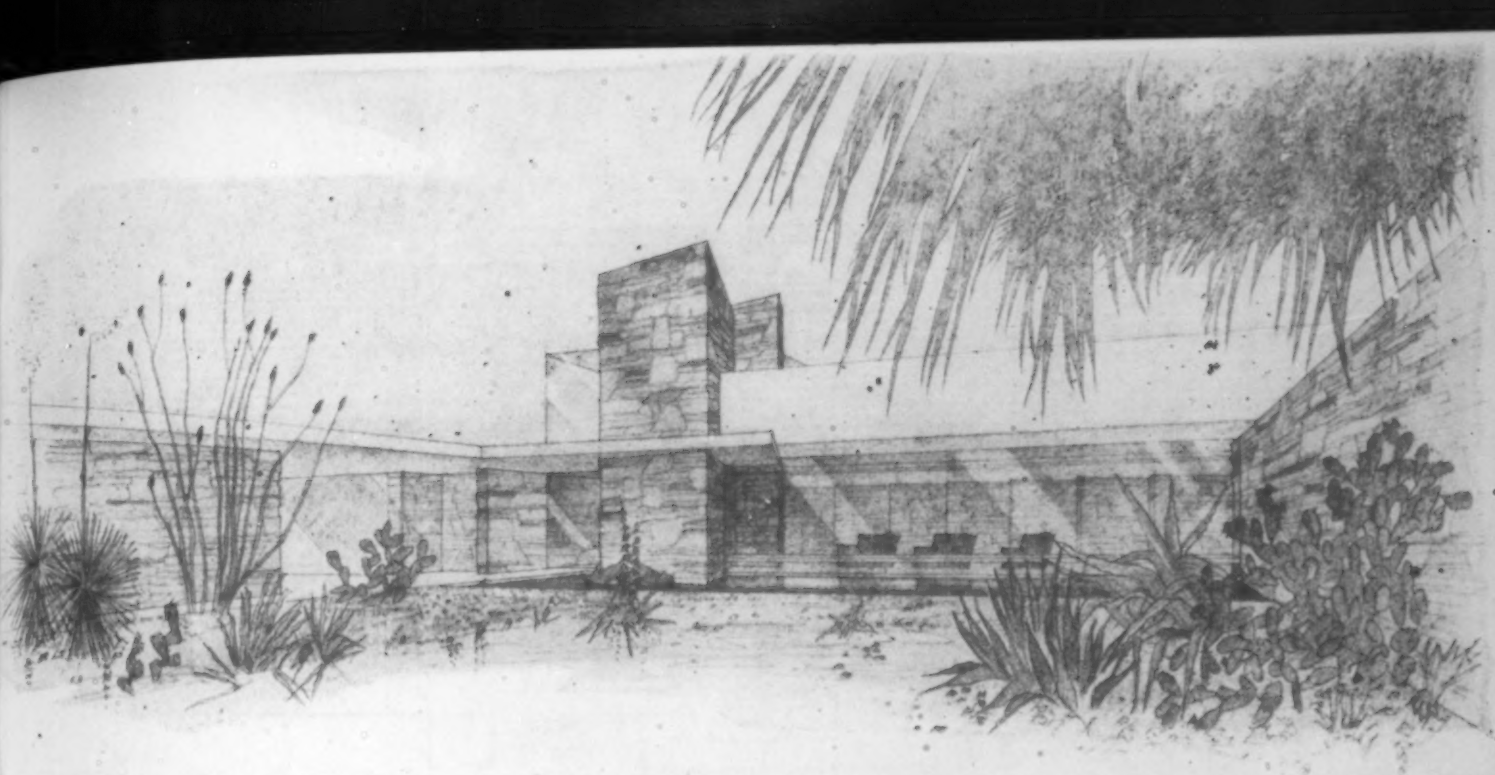
Schweikher and Elting, Architects



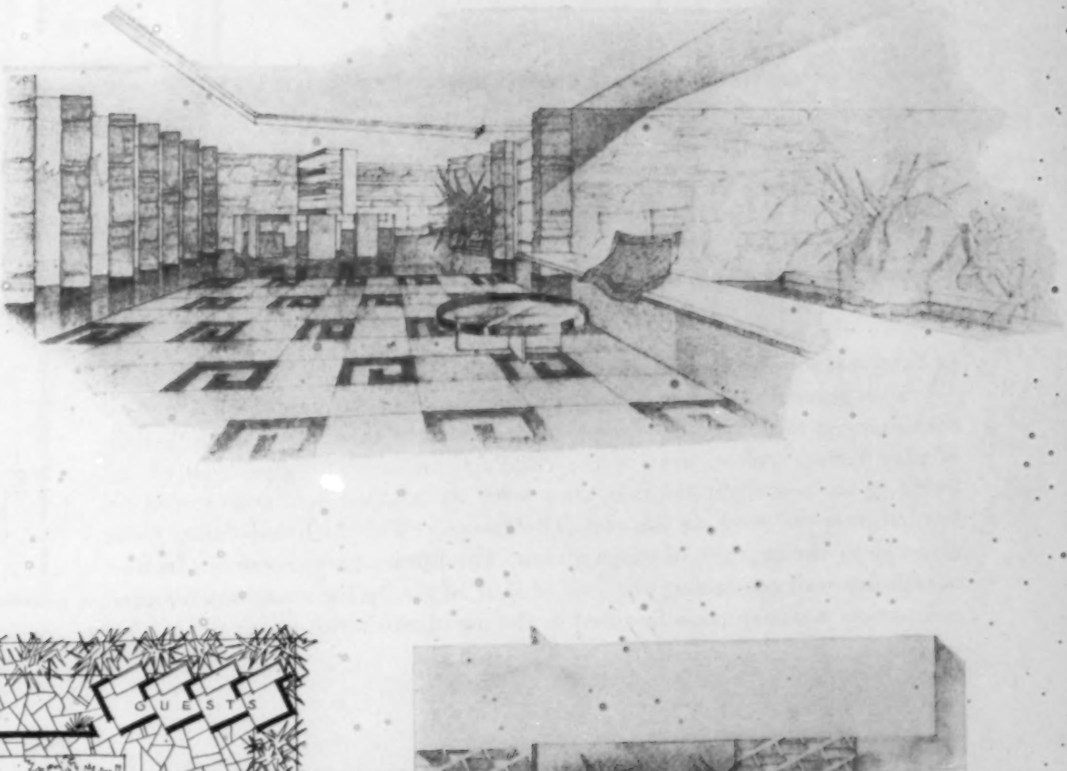
IN A design which reflects the expansive desert and exhibits a fittingly autochthonous character, every facility is provided for relaxed informal living, indoors and out. In addition to the ever-present flagged terraces and the patio, the entire roof over the living-kitchen-dining area provides an open planted terrace on which to enjoy the warming sun, the glowing sunset, or the brilliant starlit sky. Guest rooms are independent, even to having their own kitchenette, yet the spacious living room, with its interesting segmented north wall, and the glass-enclosed "observatory," provide for congenial gatherings, well protected from winter breezes. The house, primarily for winter vacations, will be of stone, concrete and glass.



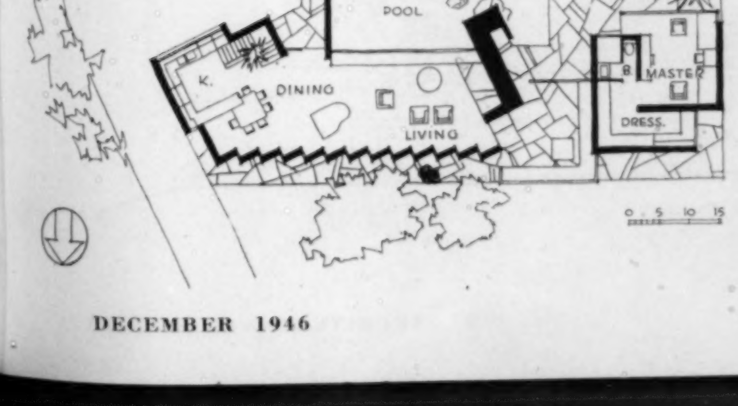


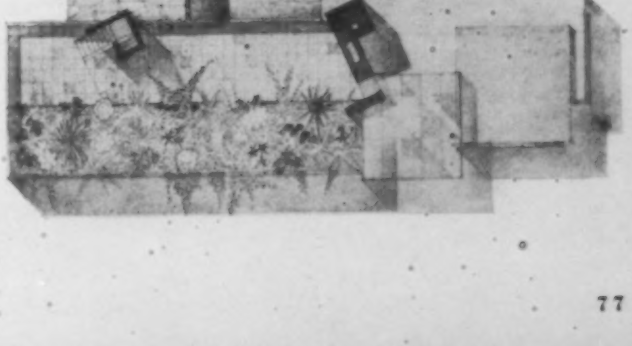


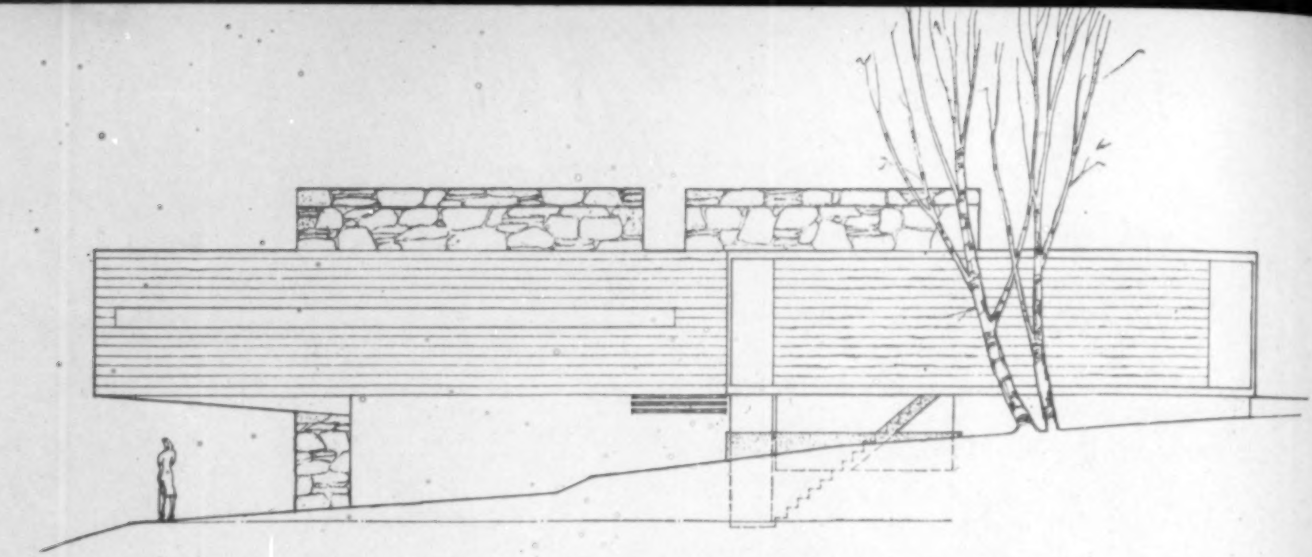
The patio, toward the living room



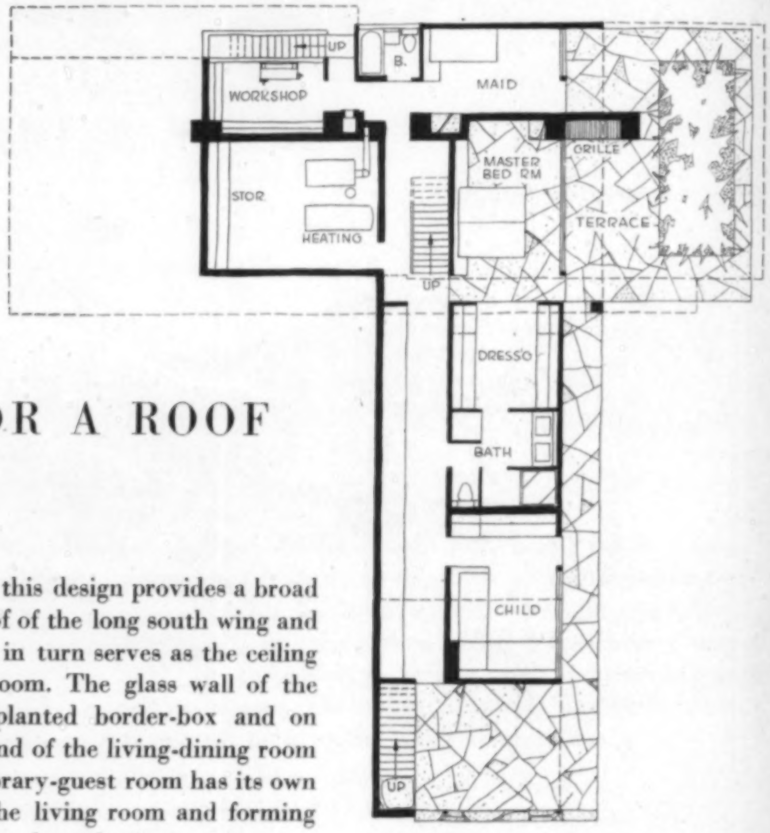
The living room, toward the dining area


SERVANT
B.
K.
GUESTS
B
CARS
POOL
B
MASTER
K.
DINING
LIVING
DRESS.
0 5 10 15





NORTH

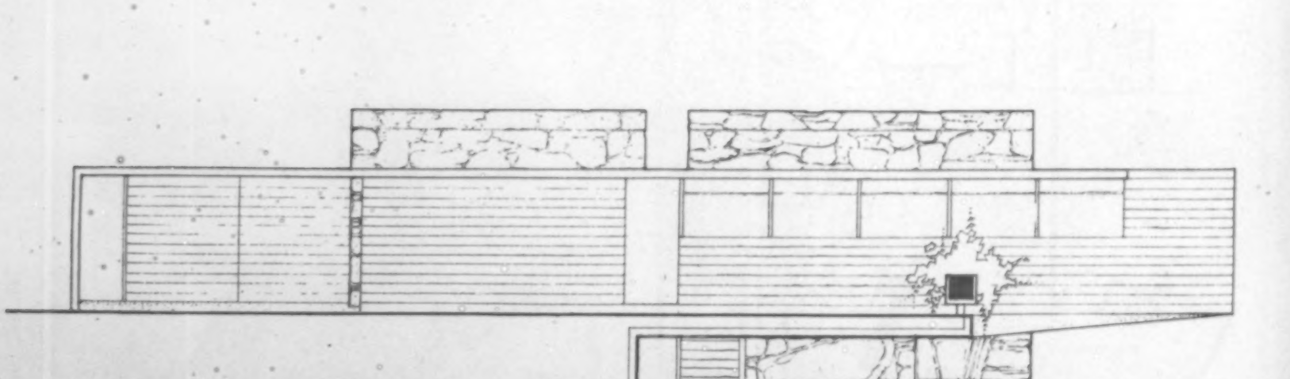

UP
B.
MAID
WORKSHOP
MASTER BED RM
GRILLE
STOR
HEATING
TERRACE
UP
DRESS'G
BATH
CHILD
UP

LOWER FLOOR

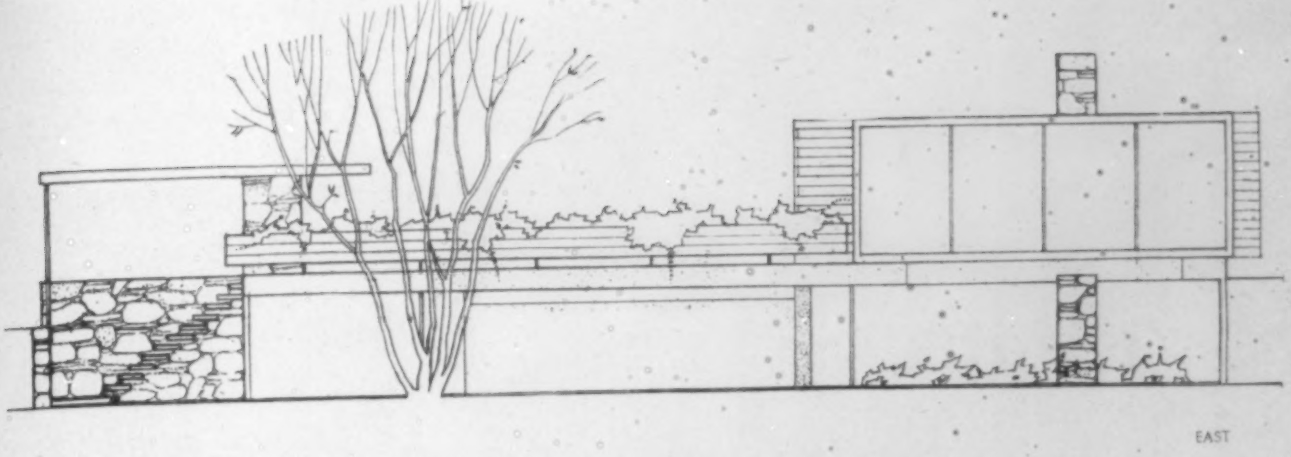
4. WITH A LAWN FOR A ROOF

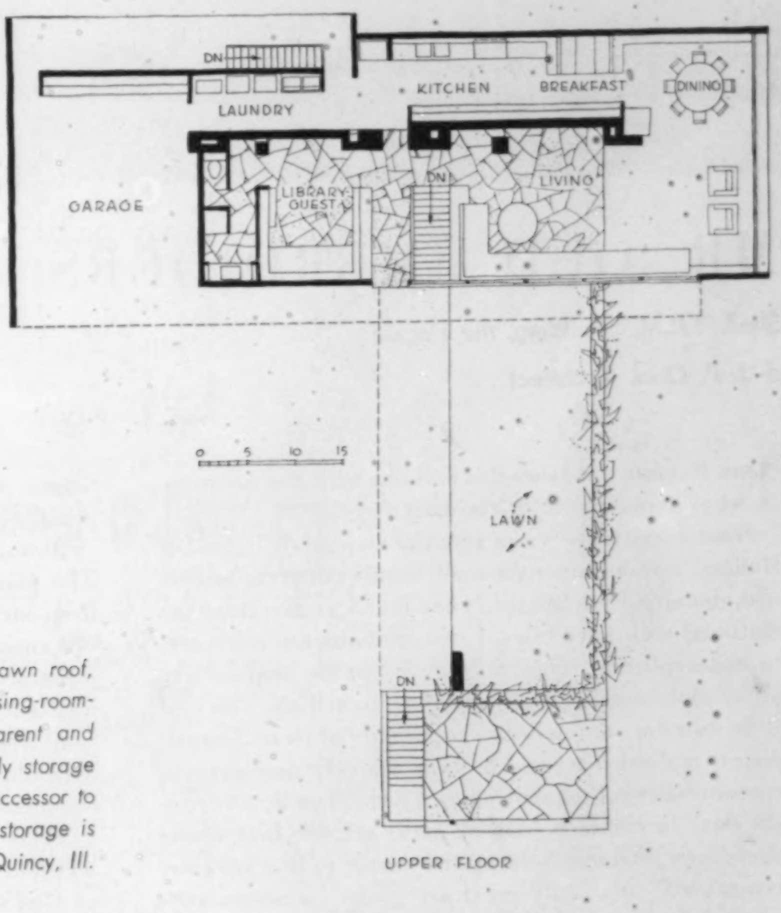
Schweikher and Elting, Architects

Again making the utmost of the hillside slope, this design provides a broad level grassed terrace by placing it on the roof of the long south wing and continuing it to the roofed stone terrace, which in turn serves as the ceiling of play terrace below, next to the child's bedroom. The glass wall of the living room looks out on this lawn with its planted border-box and on beyond over the creek to the east. The dining end of the living-dining room also enjoys the expanse of eastern view. The library-guest room has its own hearth-fire wall continuing the line of that of the living room and forming companion masonry mass featured in the north and south views.

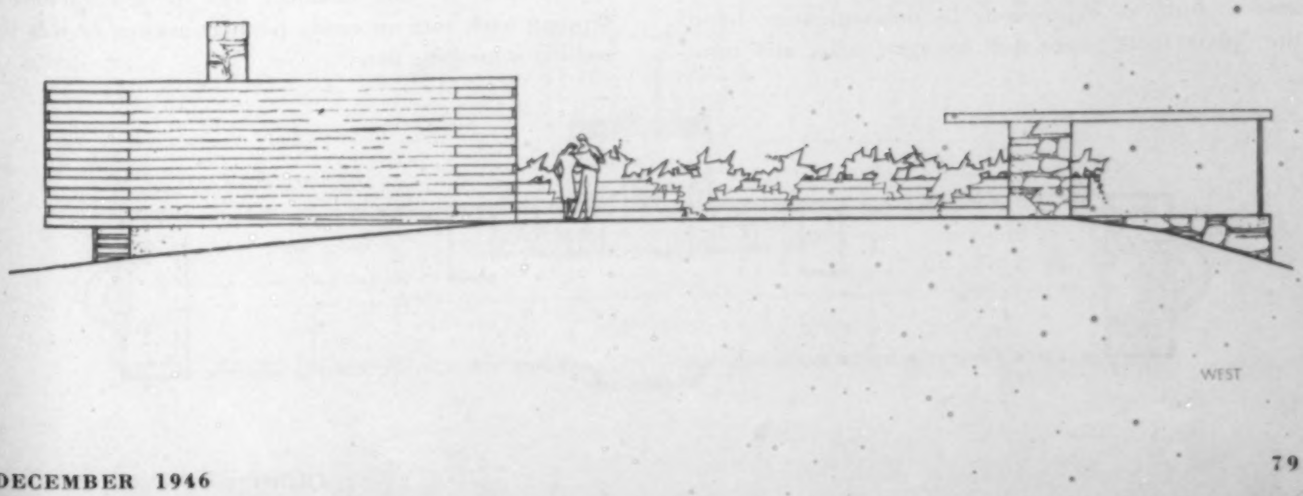


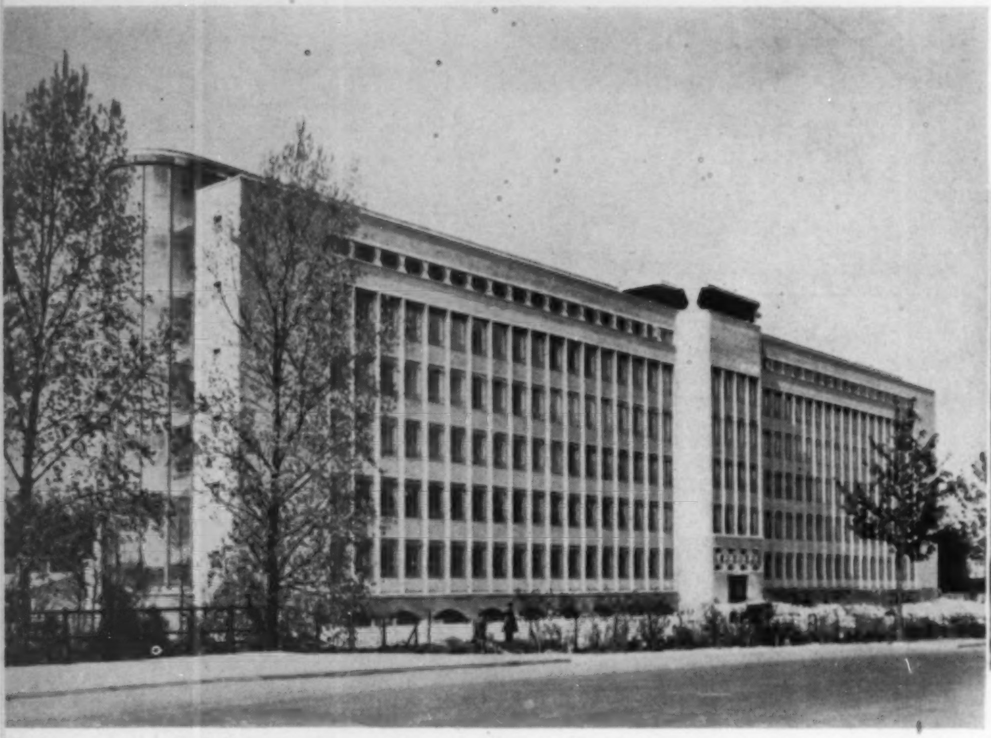
SOUTH

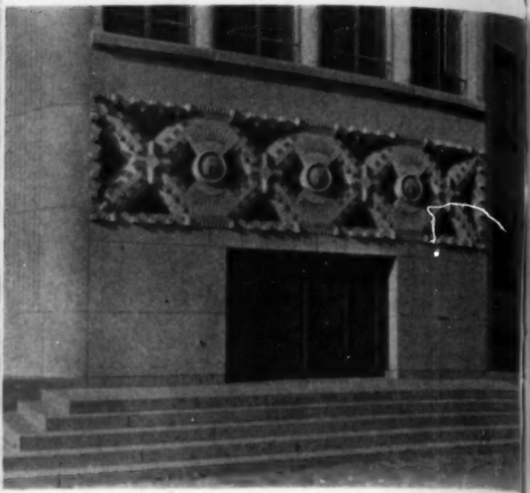



DN
LAUNDRY
KITCHEN
BREAKFAST
DINING
GARAGE
LIBRARY-GUEST
DN
LIVING
0 5 10 15
LAWN
DN
UPPER FLOOR

The bedroom wing is protected and insulated by its lawn roof, which cantilevers out to form a sunshade. The dressing-room-bath arrangement gives greater privacy to both parent and child, and serves as a sound buffer as well. Orderly storage space along the corridor wall provides a welcome successor to the prewar (and easily cluttered) cellar. Additional storage is supplied in the heater room. The house is to be near Quincy, Ill.







MR. OUD EMBROIDERS A THEME

Shell "I.B.M." Building, the Hague

J–J. P. Oud, Architect

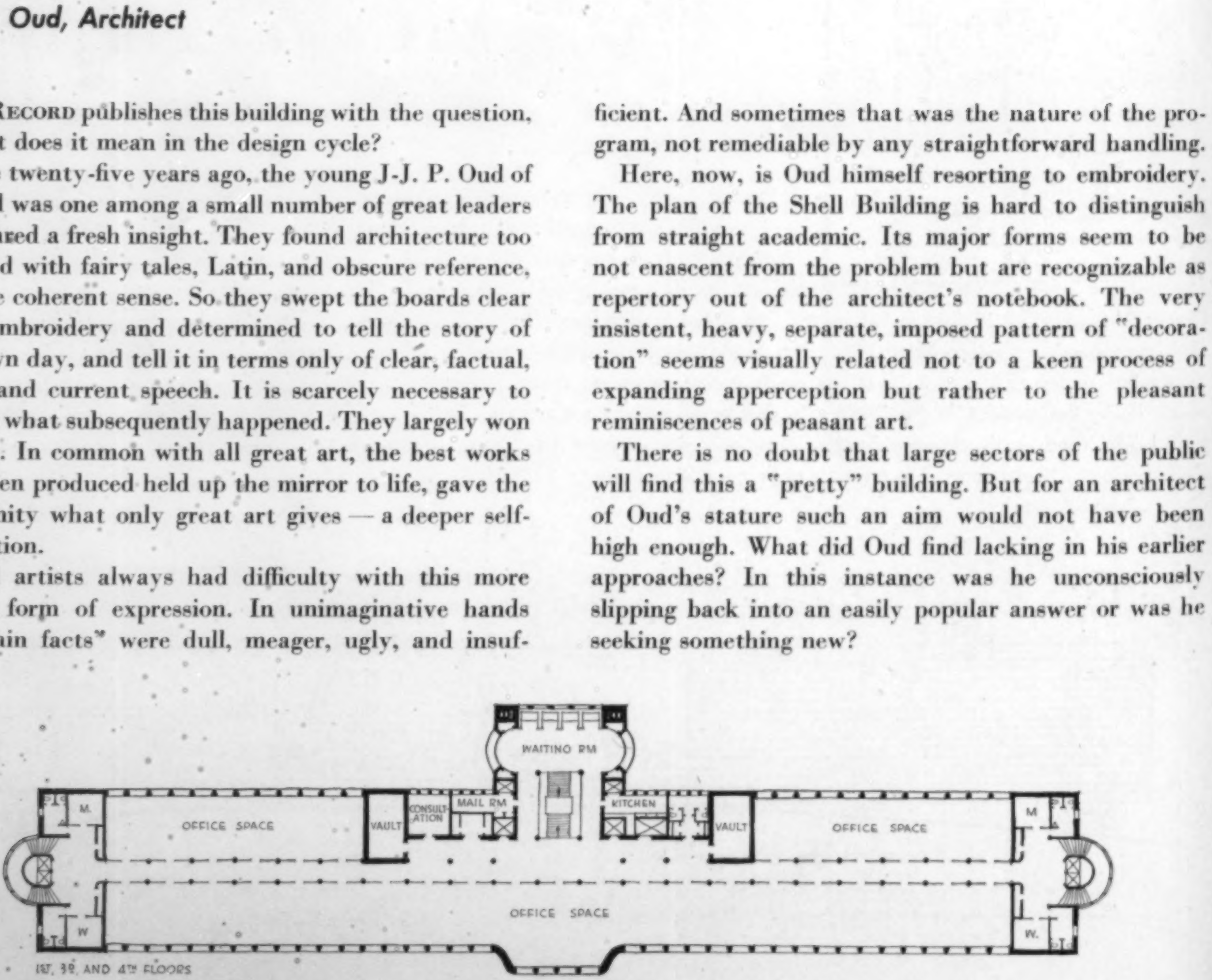
THE RECORD publishes this building with the question, what does it mean in the design cycle?

Some twenty-five years ago, the young J-J. P. Oud of Holland was one among a small number of great leaders who shared a fresh insight. They found architecture too cluttered with fairy tales, Latin, and obscure reference, to make coherent sense. So they swept the boards clear of all embroidery and determined to tell the story of their own day, and tell it in terms only of clear, factual, direct, and current speech. It is scarcely necessary to recount what subsequently happened. They largely won the day. In common with all great art, the best works these men produced held up the mirror to life, gave the community what only great art gives — a deeper self-recognition.

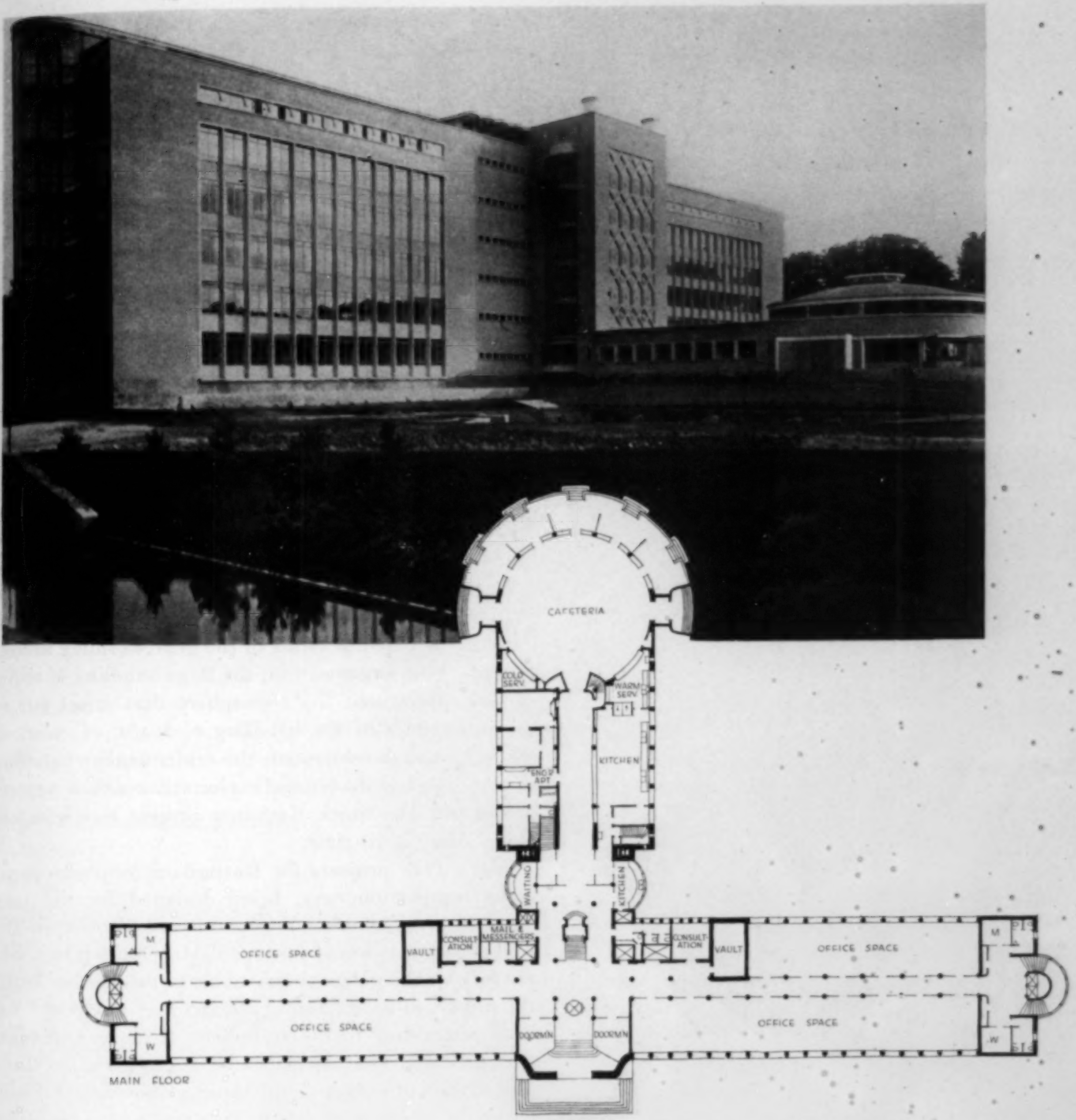
Small artists always had difficulty with this more austere form of expression. In unimaginative hands the "plain facts" were dull, meager, ugly, and insufficient. And sometimes that was the nature of the program, not remediable by any straightforward handling.

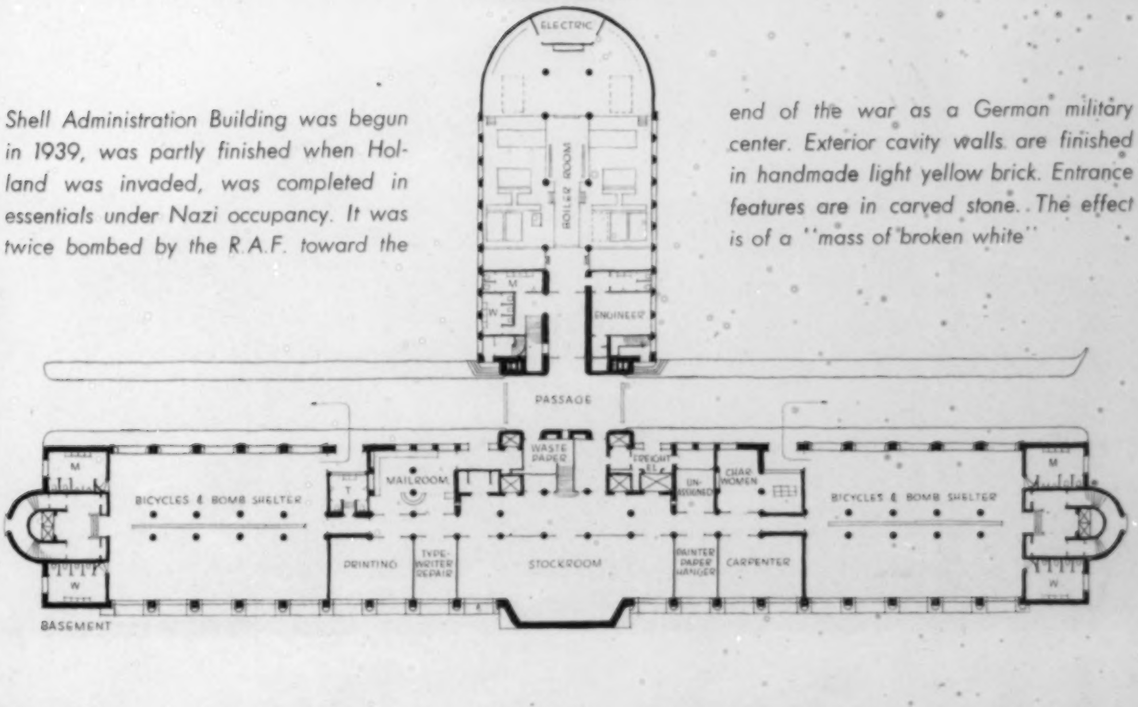
Here, now, is Oud himself resorting to embroidery. The plan of the Shell Building is hard to distinguish from straight academic. Its major forms seem to be not enascent from the problem but are recognizable as repertory out of the architect's notebook. The very insistent, heavy, separate, imposed pattern of "decoration" seems visually related not to a keen process of expanding apperception but rather to the pleasant reminiscences of peasant art.

There is no doubt that large sectors of the public will find this a "pretty" building. But for an architect of Oud's stature such an aim would not have been high enough. What did Oud find lacking in his earlier approaches? In this instance was he unconsciously slipping back into an easily popular answer or was he seeking something new?

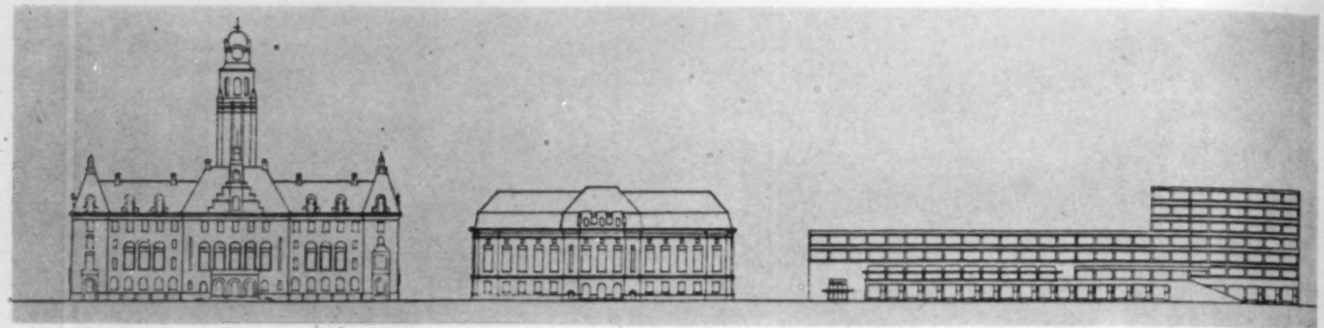


1ST, 3RD AND 4TH FLOORS


CAFETERIA
COLD SERV.
WARM SERV.
ENGR. APT.
KITCHEN
WAITING
KITCHEN
MAIL & MESSENGERS
CONSULTATION
VAULT
CONSULTATION
VAULT
OFFICE SPACE
OFFICE SPACE
OFFICE SPACE
OFFICE SPACE
M
W
M
W
DOORMN
DOORMN
MAIN FLOOR

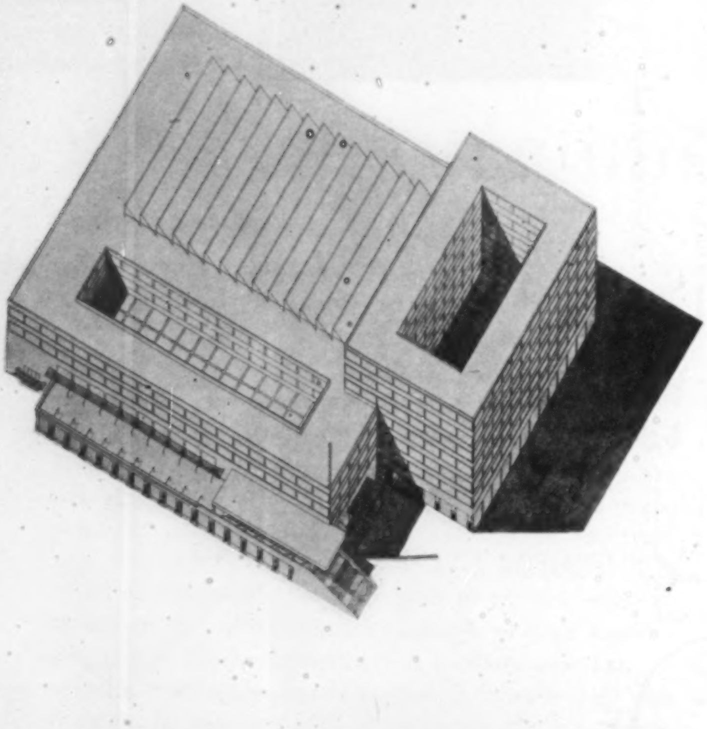

ELECTRIC
BOILER ROOM
M
W
ENGINEER
PASSAGE
WASTE PAPER
FREIGHT EL.
MAILROOM
T
UNASSIGNED
CHAR WOMEN
BICYCLES & BOMB SHELTER
BICYCLES & BOMB SHELTER
PRINTING
TYPEWRITER REPAIR
STOCKROOM
PAINTER PAPER HANGER
CARPENTER
M
W
M
W
BASEMENT

Shell Administration Building was begun in 1939, was partly finished when Holland was invaded, was completed in essentials under Nazi occupancy. It was twice bombed by the R.A.F. toward the end of the war as a German military center. Exterior cavity walls are finished in handmade light yellow brick. Entrance features are in carved stone. The effect is of a ''mass of broken white''



Illustrations courtesy of the Museum of Modern A

Oud's 1926 Stock Exchange Project: above shown with two adjacent existing buildings; below shown in isometric projection

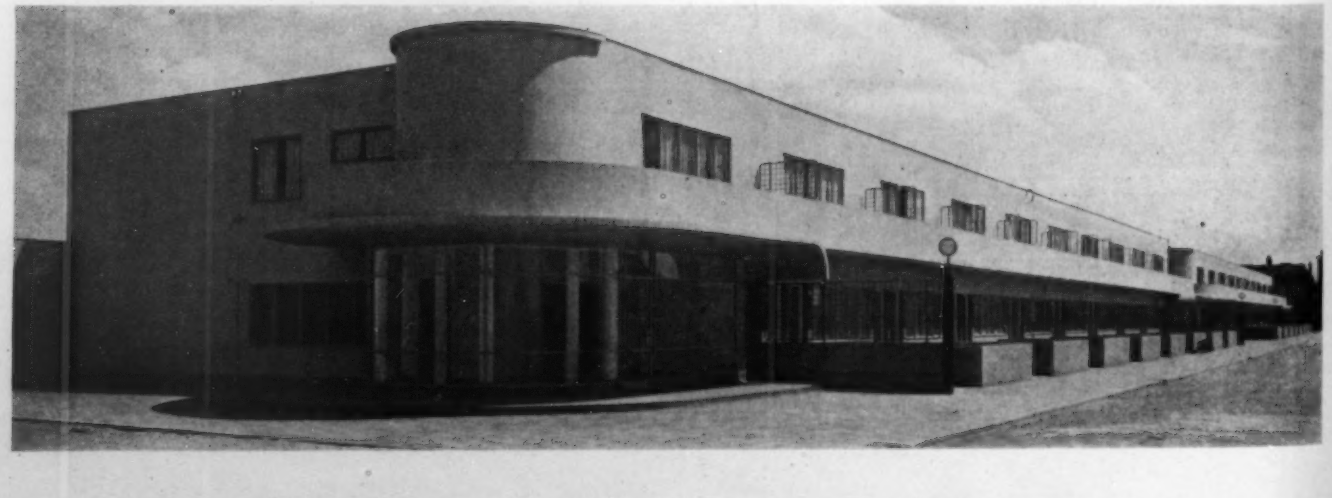


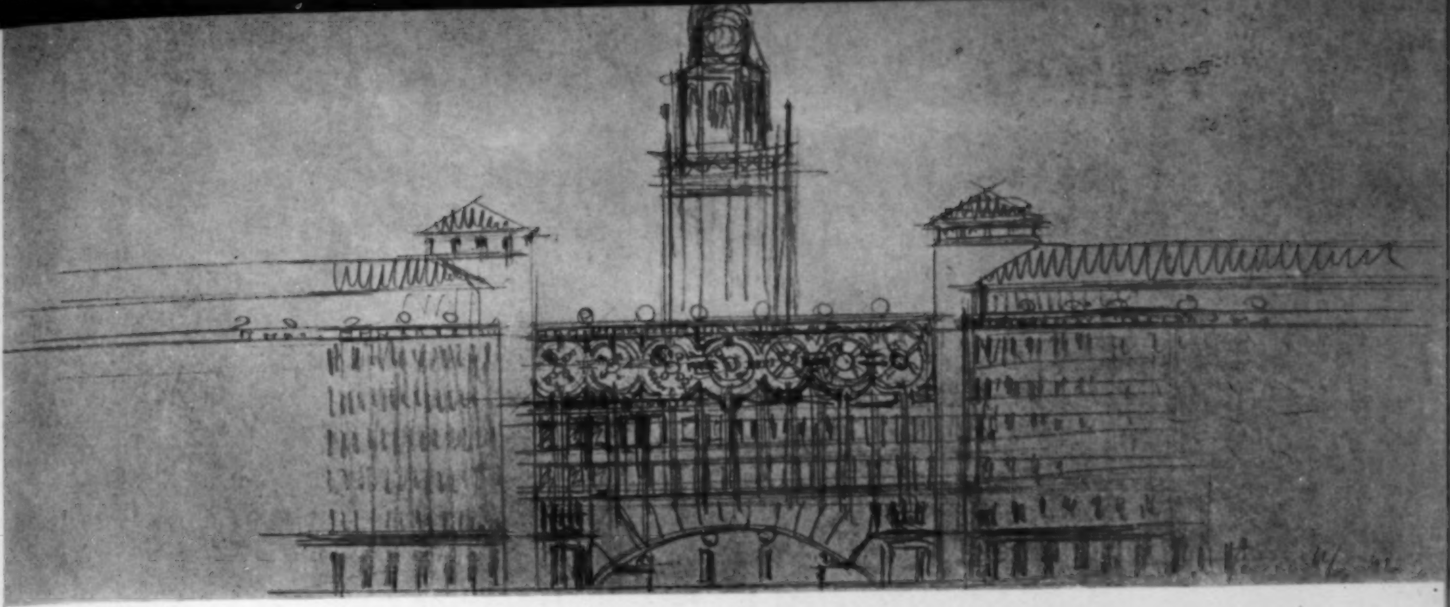
The evidence was submitted to American critics. Comment from those who made replies was largely centered on the question, "what makes architecture human?"

In Oud's former work, such as the famous project of 1926 for the Rotterdam Stock Exchange (see above) the answer was posed in terms of the great building fundamentals: clear organization; the large handling of scale; careful adaptation; the atmosphere that arises out of the intangibles of the handling of space, of color, of sequence and development; the craftsmanlike handling of materials and the sensual exploitation of their natural properties. The Stock Exchange project was rejected, being ahead of its time.

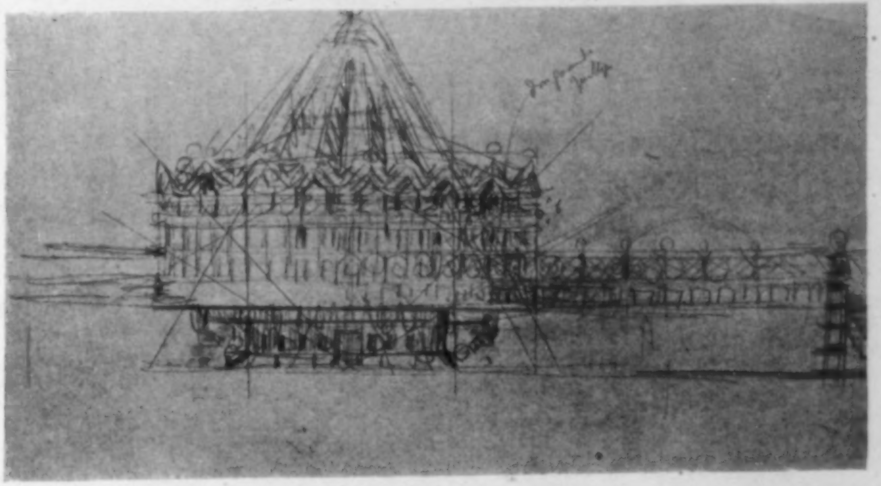
Oud's 1943 projects for Rotterdam (opposite page) make comparison easy, being designed for the very same city neighborhood (see the same tower in the background). It would seem as if Mr. Oud felt he could not rely on the public to rise to his former terms. While the public, in an interim of a quarter of a century, has been responding to the statement of its own new experience, Mr. Oud seems to be going back, to those simplicities of concept and those elaborations of execution by which fairy tale readers are so easily pleased.

Below, 1927 Workers Housing

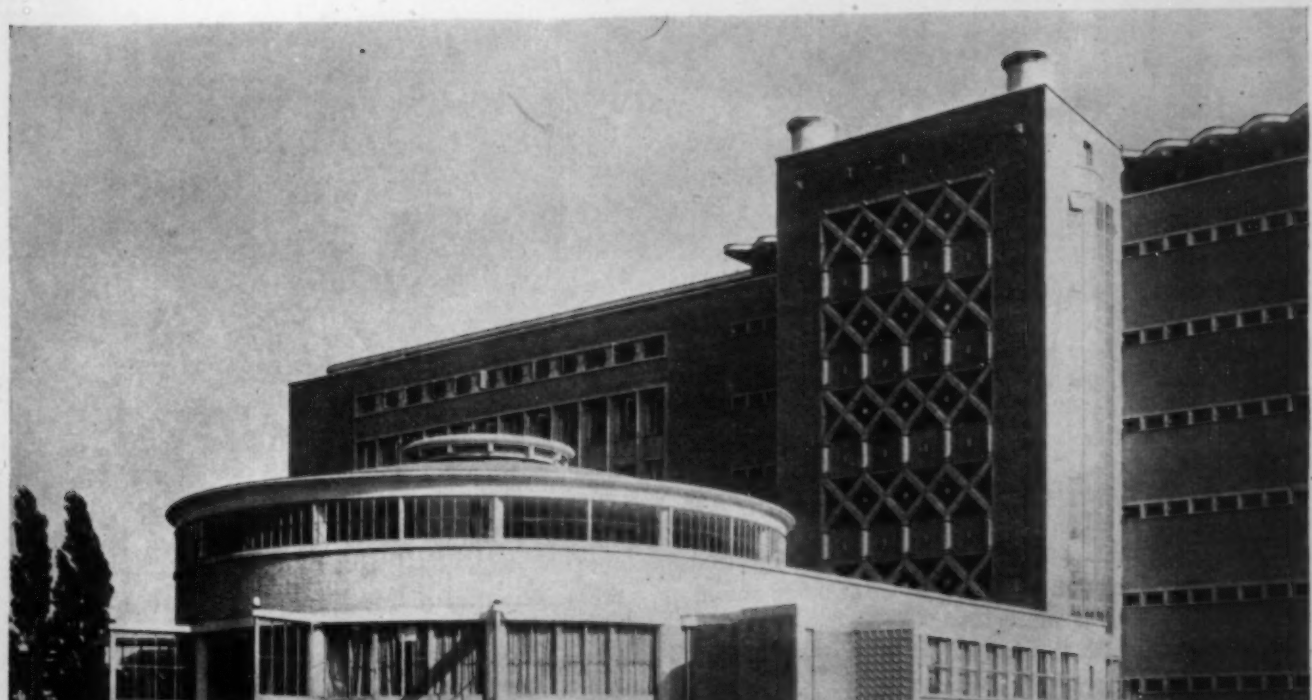


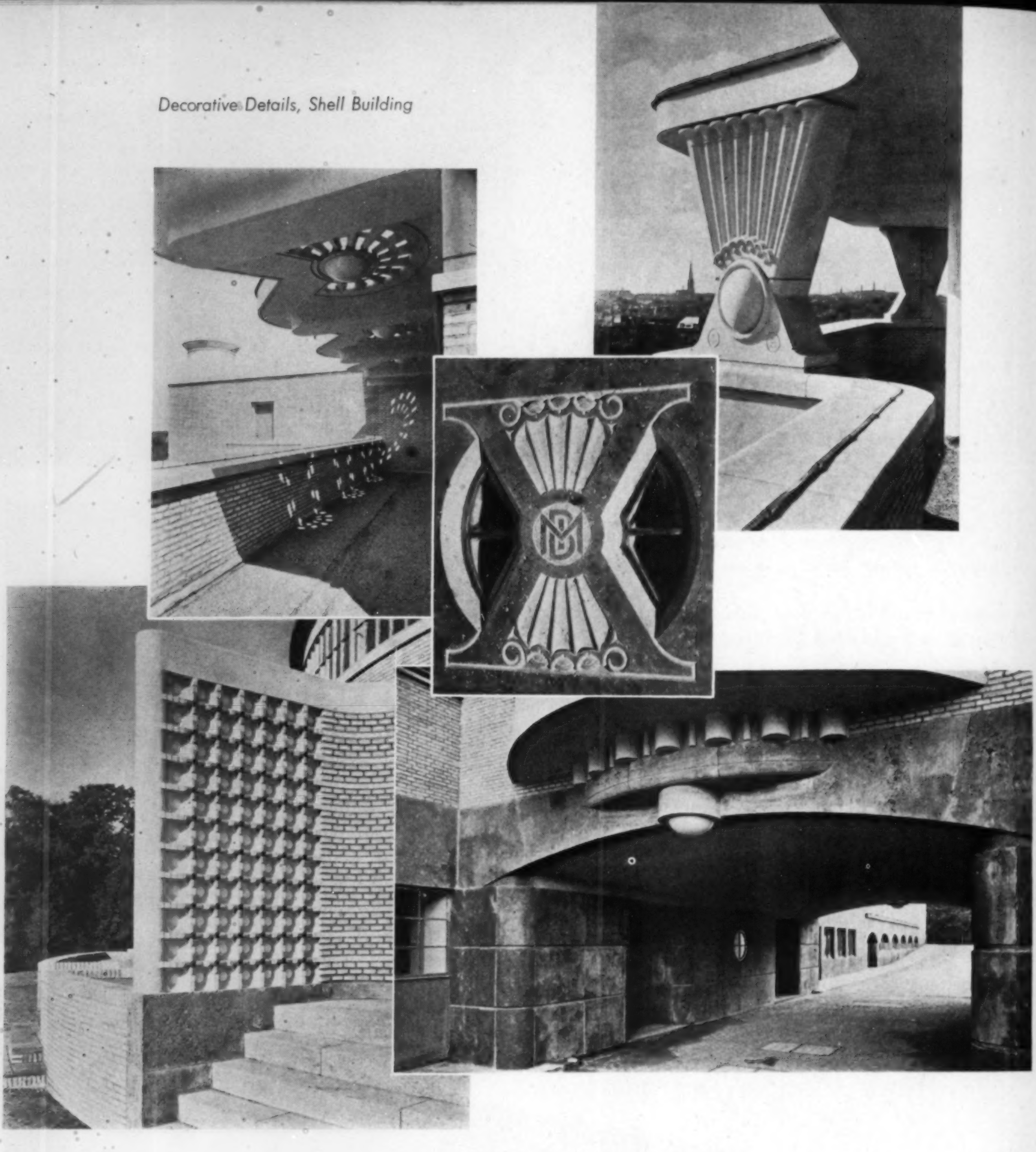


Above and right, 1943 City Center Project, Rotterdam



Below, 1939 Shell Building Showing Restaurant

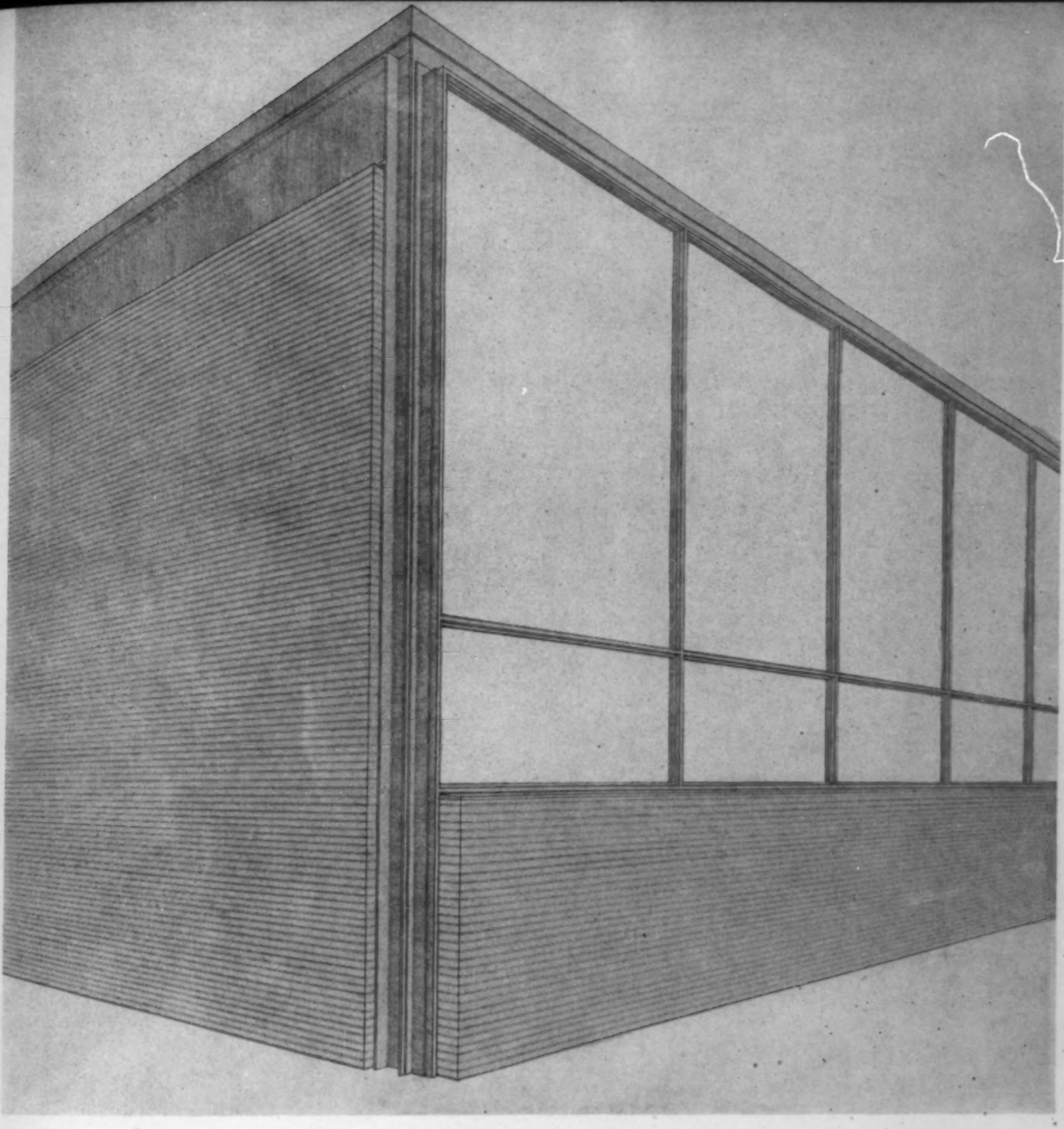




Decorative Details, Shell Building

Two opposite opinions were clearly expressed, both by competent critics, on the kind of decoration which is here seen in detail. One critic squarely declares that "Mr. Oud may be continuing his career of being among the most progressive of architects." He believes that this work may mark the end of a "transitional phase" in greater "maturity." To this critic, "some of the details seem to be of the greatest originality and full of Oud's particular quality of sensitive imagination." This goes contrary to the opinion just expressed. Another critic, expressing dissatisfaction, compares the "solemn and aggressive" details to the work on Hamburg skyscrapers 25 years ago.

Record editors are more inclined to agree with the general trend of the latter observation; but this is not the main point in bringing up the subject. For the question raised goes beyond Mr. Oud or any other individual. The question relates to those irrationalities of human nature, those elements of sheer play, those demands for symbol and story, that once found their frank outlet in "decoration." Is every designer quite sure that all his "functional" devices are quite so inevitably a response to rational need? And if, on quiet examination, some of them are not, how might natural human irrationality be better acknowledged — so as to lead not to "compromise" but to a deeper apperception?



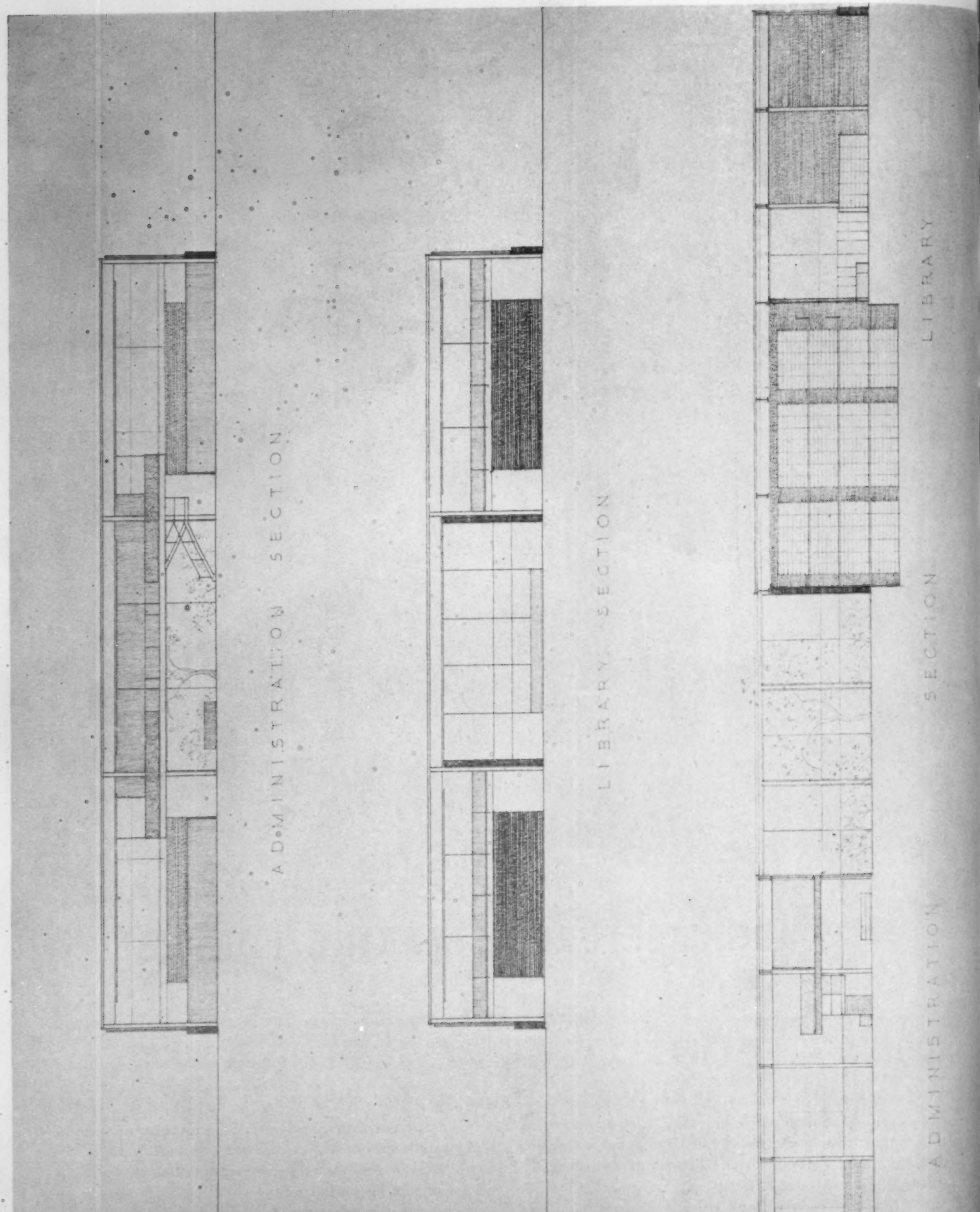
ARCHITECTURE "SPEAKING FOR ITSELF"

Library and Administration Building, Illinois Institute of Technology

L. Mies van der Rohe, Architect

When not another single line may be removed, when no part can be more simplified in form or more generalized in use, when nothing can be more accurately placed, Mies van der Rohe is prepared to release a design that may have occupied years of study. It is, as an English writer has declared, "that sensitivity of line, and that precision, purity, and sensitivity of design in general," which "has placed its author among the handful of contemporary leaders in architecture, in spite of the small amount of work he has executed."

It was originally intended to reproduce these drawings as part of the November Building Types Study on University Libraries. Yet the significance of the work so transcends any special field of building that publication has been put over until now to permit a more ample presentation.


ADMINISTRATION SECTION
LIBRARY SECTION
ADMINISTRATION
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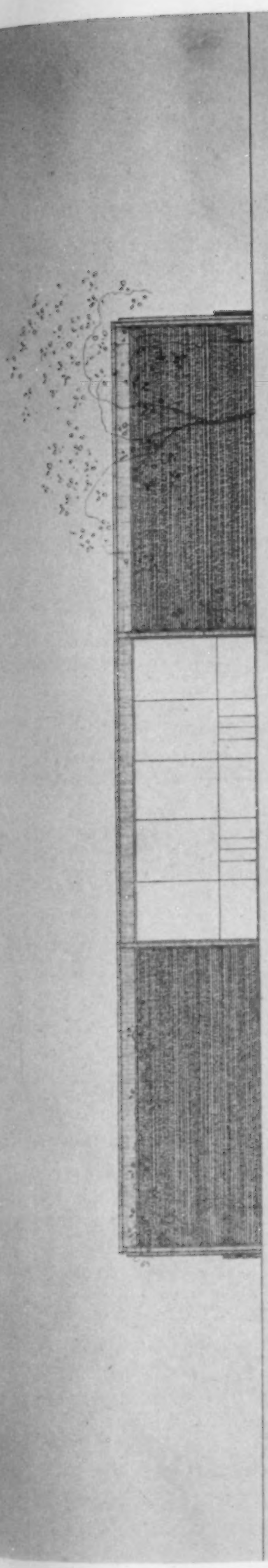
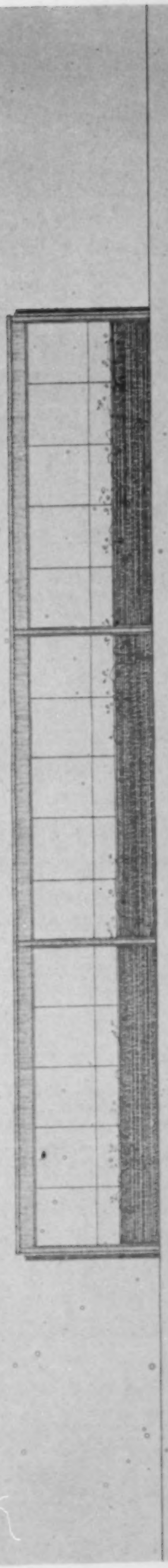
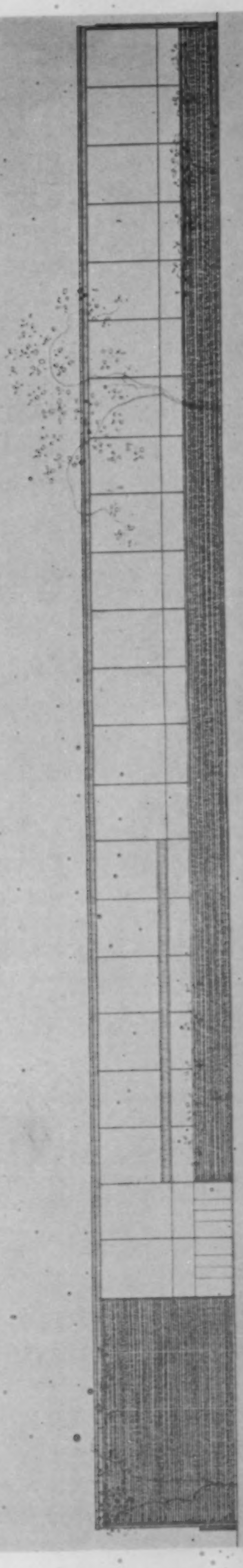


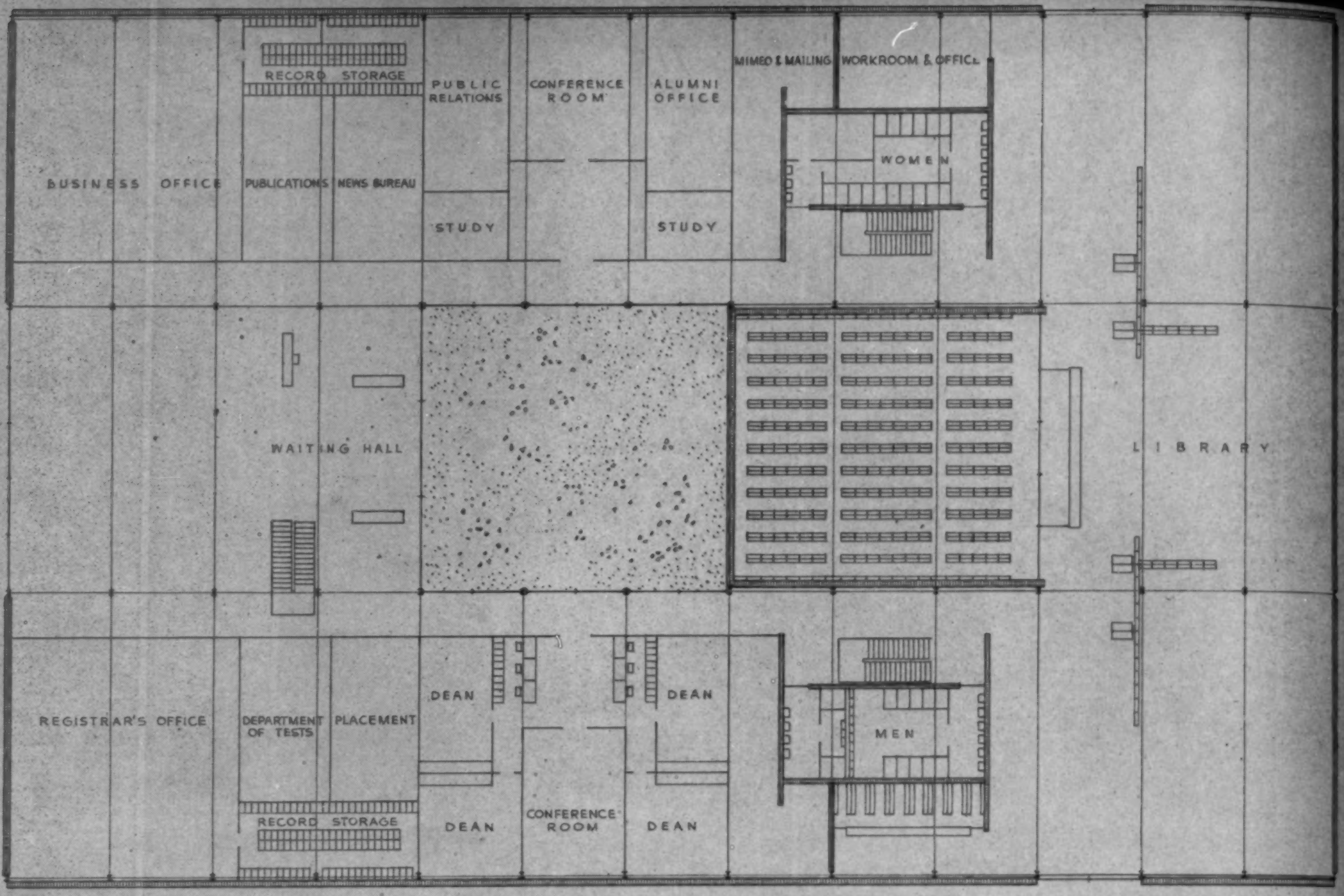
SOUTH ELEVATION



NORTH ELEVATION

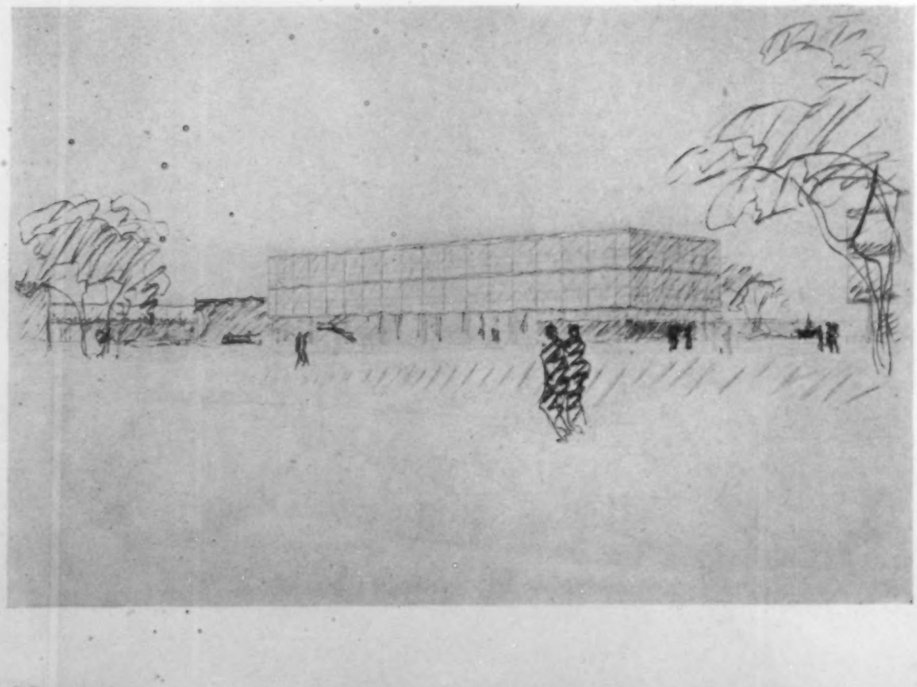


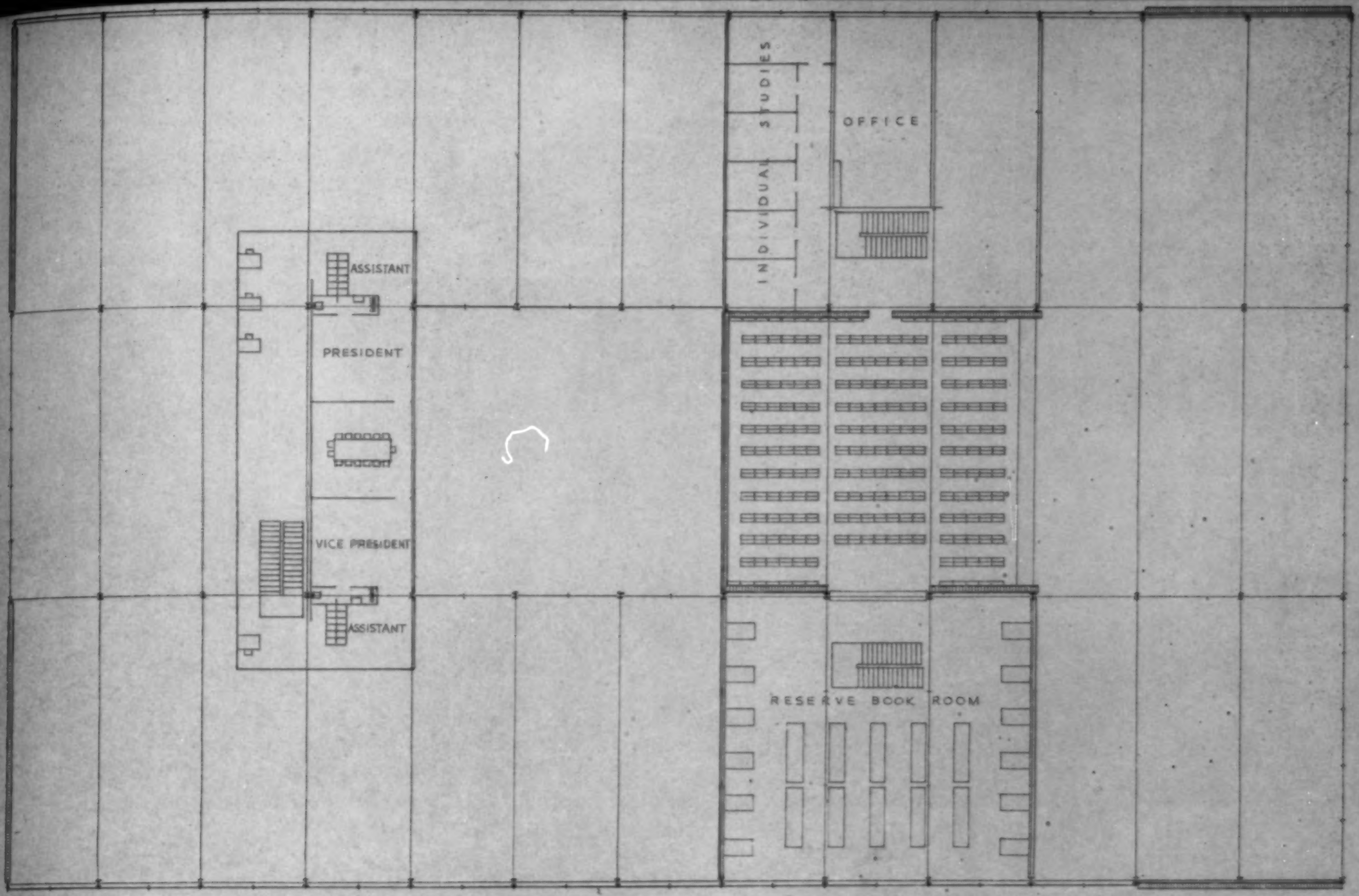
WEST ELEVATION


RECORD STORAGE
PUBLIC RELATIONS
CONFERENCE ROOM
ALUMNI OFFICE
MIMEO & MAILING
WORKROOM & OFFICE
WOMEN
BUSINESS OFFICE
PUBLICATIONS
NEWS BUREAU
STUDY
STUDY
WAITING HALL
LIBRARY
DEAN
DEAN
REGISTRAR'S OFFICE
DEPARTMENT OF TESTS
PLACEMENT
MEN
RECORD STORAGE
DEAN
CONFERENCE ROOM
DEAN

MAIN FLOOR PLAN

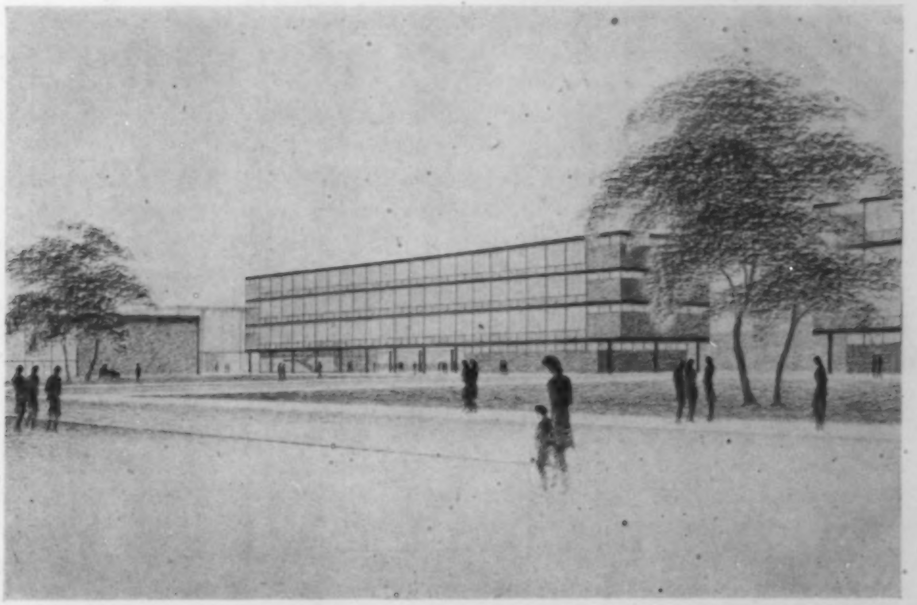
This library and administration building forms part of a campus plan for the Illinois Institute of Technology at Chicago, involving fourteen buildings among which only the Metallurgy Building has as yet been published. The structural system of steel frame yellow brick walls, and steel or gypsum partitions produces a gridwork so utterly simple that there can be almost any combination of spaces in the interior

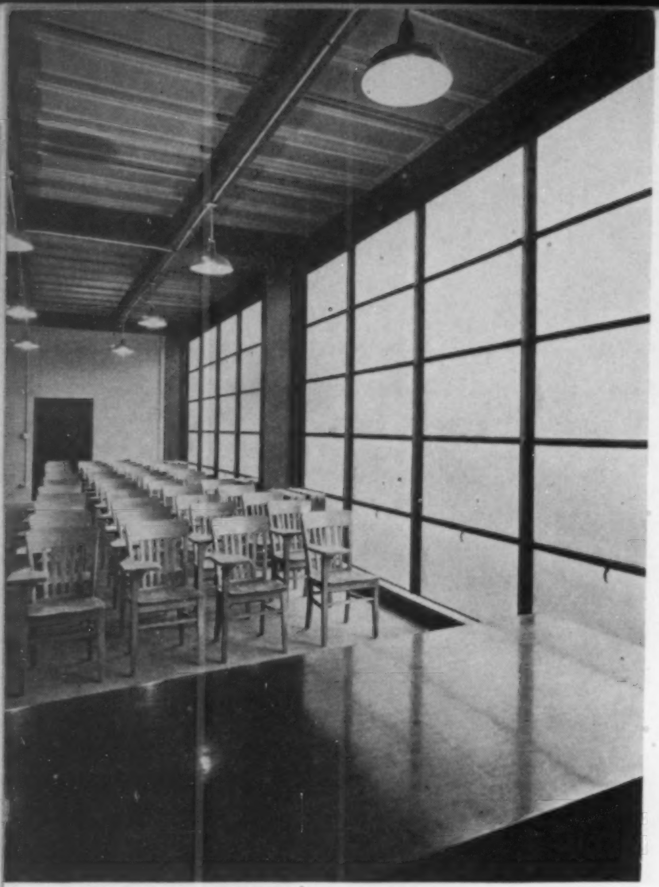



INDIVIDUAL STUDIES
OFFICE
ASSISTANT
PRESIDENT
VICE PRESIDENT
ASSISTANT
RESERVE BOOK ROOM

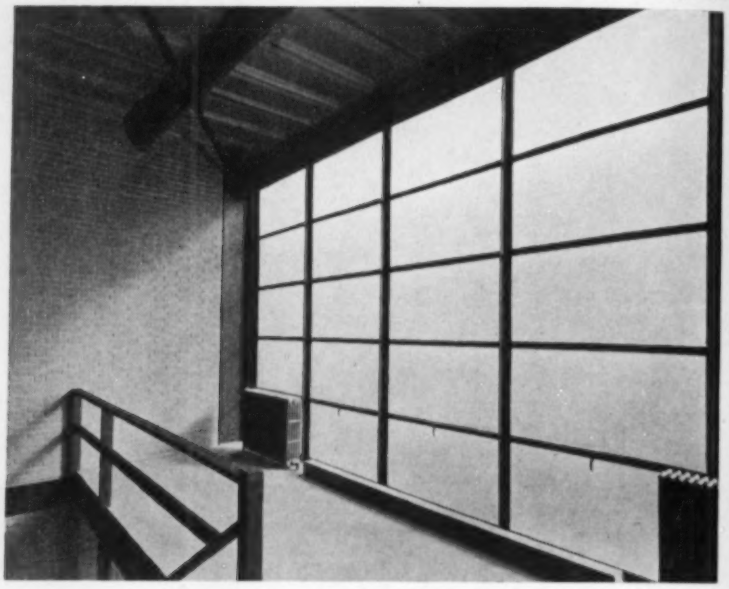
MEZZANINE FLOOR PLAN

So adaptable is this structural design that a multiplicity of subtle variations has been created among buildings of different heights, serving different purposes. The sketches on these two pages suggest the serene organization proposed for the campus as a whole, and exhibit the unmatched holography of the architect. On the two succeeding pages will be found elevations of this particular unit

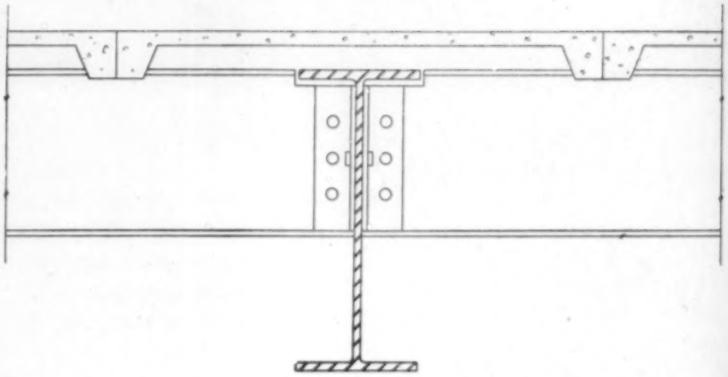


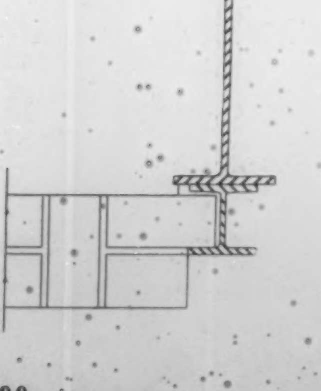


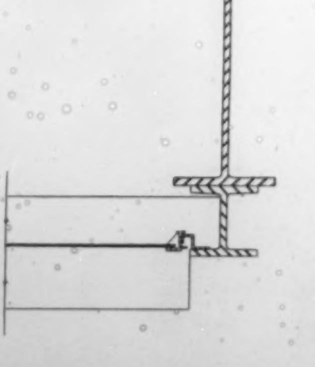
Hedrich-Blessing Photos

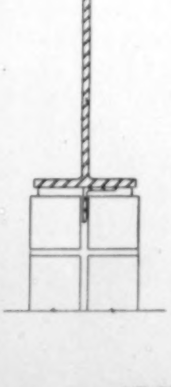


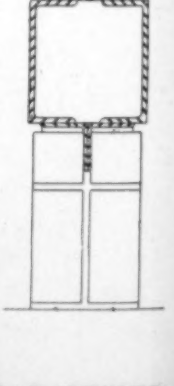
Five master details are so mastered as to serve interchangeably to produce ceiling and roof structure, wall angles underneath and alongside windows, a steel column within the wall, and a chase for pipe or conduit (photographs above, perspective page 85)











". . . anything that will make a plant a more desirable choice as a place to work, and anything that will add a per cent or a fraction of one to the efficiency of the men at work will readily justify its cost. . . ."

Hedrich-Blessing Photo; Norden bombsight plant, The Austin Company, engineers and builders

INDUSTRIAL BUILDINGS

ARCHITECTURAL RECORD'S

BUILDING TYPES STUDY NUMBER 120

In Collaboration with "Mill and Factory"

THE PLANT AS A PLACE TO WORK

By Roland Wank

Associate, Fellheimer & Wagner, Architects and Engineers

Wartime production records of American plants astonished a world which already held an exaggerated belief in their powers. We were amazed ourselves, for didn't many of us ridicule at the start the seemingly impossible goals of 50,000 and 75,000 airplanes?

The extraordinary feat not only rescued the world, including American industry, from an unspeakable fate, but also instilled new respect for our machinery of production in the public, which through the depression years, began to nurse some uncomplimentary thoughts.

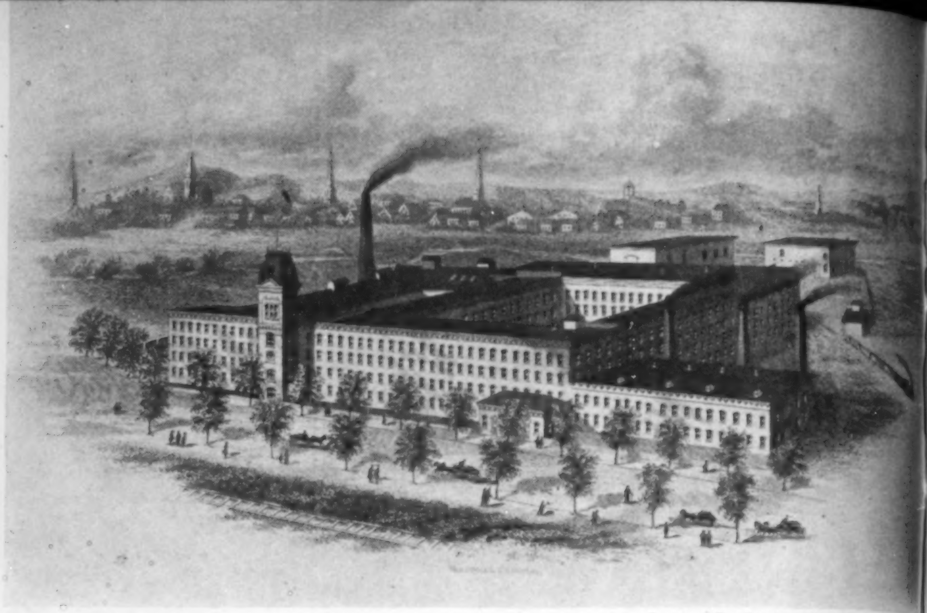
While the production miracle was no doubt a composite result of many forces — as, for example, governmental coordination of all industry — there can be hardly any doubt that wartime cooperation between labor and management was an outstanding factor. With the war over and cooperation badly cracked, performance is a good deal less impressive.

Labor relations, and partly connected therewith, public relations of industry, are critical elements in the struggle for survival of free enterprise. And, of course, the architect of industrial plants is concerned that his designs express, and his inventiveness and intuition assist, labor and public relations policy.

Paternalistic measures for labor welfare were in dubious repute long before the war. The many devices installed for the duration to tap new labor reservoirs, to compete for what labor there was, and to improve attendance and efficiency (as nurseries, shopping services, employee car maintenance and emergency road service) are likely to disappear without much trace. Right now in the larger industries both management and labor seem to consider it bad form for industry to offer any employee facilities or services unless they were first demanded and bitterly fought for by the unions.

Nevertheless, new plants built for war production lifted the entire concept of housing modern industry to a permanently higher plane. In contrast to many prewar industrial plants which just grew, and in which each new wing or building was compromised at the outset by existing conditions, wartime plants were usually planned from scratch, mostly in virgin territory with plenty of elbow room.

While they were moderately handicapped at times by materials shortages, this was amply offset by a certain ebullience and derring-do in their planning and construction. The penny-pinching in which corporate managements often indulge was not necessary, and stylistic notions which sometimes conflict with efficient design yielded to a basically mass-concept. Approaches, *"Early New England manufacturers must have taken a good deal of pride in their plants, judging by the careful disposition and attractive lines of their many-windowed, tower-topped buildings. . . . The swing toward the contemporary gleaming structure coincided with the growing independence of labor and the critical attention of the public"*



Courtesy, The Bettmann Archive

parking, locker rooms, cafeterias, railroad sidings, sometimes airfields for shipping the product — all were conceived on the three-shift, seven-day basis, which was postulated by some peacetime thinkers of the preceding generation as the one reasonable way to operate modern technology.

Above all, war plants were new, and being new they benefited wholesale by all the architectural and engineering advances that were previously applied haltingly and piecemeal. Postwar planning of plants for satisfactory employee relations, as for other aspects, must thus start from a new benchmark, from a new level of bright, spacious, efficient civilization that is vastly ahead of the domestic and recreational surroundings of employees during their leisure hours.

The word "must" is more than a figure of speech. It seems evident that industry is now engaged in competition for labor, and that for a variety of reasons this condition is likely to persist for a long time, even through depressions. By and large, producers of goods having a high labor content are at a disadvantage in this competition. The needle trades, foundries, brickyards and other enterprises where payroll is a dominant part of production cost generally depended upon foreign and second generation labor which is practically extinct, or sharecroppers and hillbillies who aren't as eagerly submissive as they used to be. Crowding, excessive heat, noise, smell do not appeal to the majority of present-day work-seekers, the less so since millions of them are now familiar with the last word in highly mechanized and partly automatic war production. The brawny son of toil has been succeeded by the self-assured, wide-awake graduate of high or trade schools, even colleges, not looking for manual labor, but rather for the intelligent, semi-engineering tasks of operating precise and powerful machinery.

The more modern industries — especially chemicals, electro-metallurgical plants — which occupy an increasing area of the total national production, may surprise an outsider by the incongruously low number of employees. Sometimes in the vast halls of busily vibrating machinery or in acres of outdoor stills and cracking plants there is not a single workman in view. It is natural that the staff of labor aristocracy in such plants should receive every conceivable facility and convenience, the expense remaining just about untraceable in the cost of the finished product. But even the in-between, assembly-type industries as automobiles, aircraft, appliances, furniture tend under economic pressure toward a steady growth of mechanical equipment, with a corresponding decrease in numbers and increase in the status of labor.

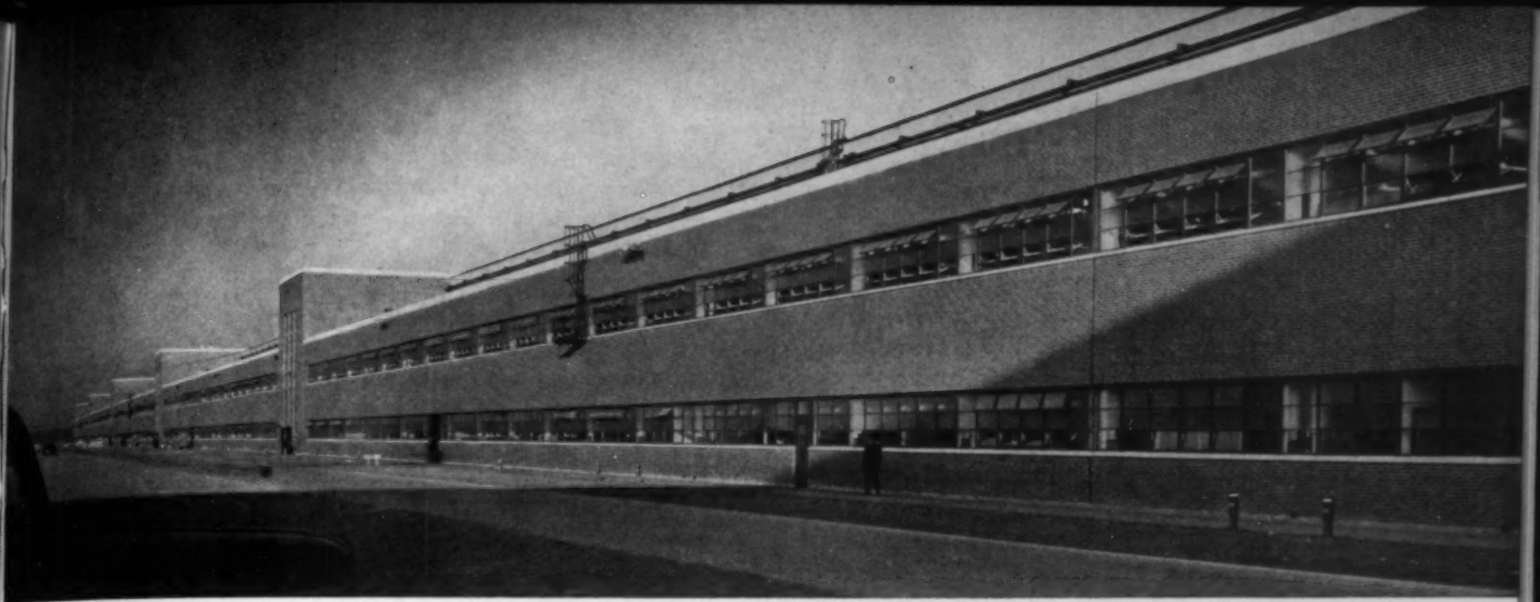
It is evident under the circumstances that anything that will make a plant a more desirable choice as a place of work, and anything that will add a per cent or a fraction of one to the efficiency of the men at work will readily justify its cost within a wide margin — not as a paternalistic gesture of good will, but as a cold-blooded business proposition. What are the physical measures that come within this scope?

Perhaps it would be best to start with some that don't. Proposals crop up here and there in architectural magazines concerning recreation grounds at plants, social halls and the like. Experience seems pretty conclusive that workers aren't interested. They want to spend as few hours as possible near their place of work and prefer their recreation elsewhere. Sometimes light lunchtime games like horseshoe-pitching, etc., find some favor, but the insistence of employees to get away as soon as possible led to a steady shrinkage of the lunch period. The original hour was reduced to three-quarters, then half, and is now 20 minutes in many of the mass-production industries, obviously leaving no time for play and creating a paradoxical situation in which management worries about the tendency of employees to neglect their physiological needs, to the disadvantage of efficiency.

Nor does labor like to use meeting places provided by management, no matter how superior they may be to union halls, beer gardens, or school auditoria.

Broadly speaking, three categories of physical provisions may be discerned as factors in employee relations.

The first category is one of which employees are



Hedrich-Blessing Photo; Willow Run plant Ford, Albert Kahn Associated Architects and Engineers, Inc.

thoroughly conscious, and on which they are insistent. Involved are mainly saving the employees' own time and items of physical comfort. Ease of access is prominent in this group: adequate parking near the place of work, or rather, near the time clock where pay begins; short walk from parking space or other transportation to the locker room or place of work (and with the general imminence of portal-to-portal pay, employers will no doubt be as concerned with this feature as labor. Good locker rooms, with ample space to handle rush periods, distributed for easy reach from work spaces and from places where employees may eat lunches brought from home and stored in the lockers, are next in line. Sanitary facilities must likewise be close to places of work in the mutual interest of employer and worker; showers are taken for granted for hot or dirty work and often demanded by other workers also, women and younger men being particularly interested in freshening up for social activities after work.

Cafeterias must be close at hand for the shortening lunch period, and must have enough counters to eliminate long waiting lines. This item, too, is of mutual interest to workers and management; the latter, having become aware of the effect of good nutrition upon efficiency, prefers that employees shall make full use of the balanced, hot meals offered, and that they shall not be rushed into gulping their food by loss of time in waiting. Even under ideal conditions, however, many employees prefer to bring their lunches and space must be provided for them, with perhaps partial service (as coffee or ice cream). Women workers are often furnished with a kitchenette adjoining the main rest room, which has gradually blossomed out with cheerful upholstered pieces and fabric curtains, in spite of reports of occasional carelessness or vandalism.

Other less keenly contested items in this first category are daylighting and ventilation. The modern plant must, of course, provide adequate artificial lighting; yet the psychological need for contact with the outside world is attested by the indicator devices used in some blackout plants which keep shut-in workers informed about the weather outdoors. Good ventilation has become a matter of course. And it is conceivable that air conditioning will eventually become a requirement, especially in the hotter climates, having already been installed in many departments as an aid to certain production processes, in office and medical wings attached to plants, as well as in officials' dining rooms and clerical cafeterias from which it tends to spread into general employee cafeterias.

The second category includes features with which employees are not so vocally concerned, but which are important to management from the point of view of safety, efficiency or legal responsibility. In lighting and ventilation plant designers are likely to set their standards much above the point at which workers would become critical. Health and medical departments are geared not only to deal with accidents, but to prevent them by initial and periodic examinations of employees and constant surveillance of the premises. Spread of contagion is minimized by checking the condition of employees returning from sick leave, and many plants install complete diagnostic and treatment facilities, sometimes including dispensaries, to cope with all aspects of service-connected disability. This may be motivated in part by the intent to reduce liability in compensation cases; to a much larger extent it is done to offer the very best service available, in humanity toward the worker, and also to return him more quickly to his post.

Safety is promoted also by training, often with slides, movies or demonstrations, in classrooms equipped for the purpose, which are usually part of an education suite used for orienting new employees and training old ones for advancement. Of recent years, color has been used for calling attention to obstructions and hazards, coding machine parts and controls, etc. In fact, color crashed the factory gates by this means and was then increasingly recognized as an effective ingredient for easing eye-strain, combating nerves and fatigue, and generally putting the worker into a more cheerful, therefore more efficient, mood. The same concept was extended to other aspects of environment and was instrumental in such architectural improvements as the substitution of clean rolled shapes for confused trusswork, or at least relegation of trusses to inconspicuous upper reaches of roofs and monitors; disciplining of rampant pipes, tubes, conduits; adoption of wide clear bays even where not required by the process; acoustic treatment of noisy rooms; and wiring for musical and other programs. It is doubtful whether labor takes much conscious notice of such matters, although controversies over color schemes have been reported as oddities; nevertheless, the added dignity and livability of the places of work cannot help but become a favorable factor in labor relations. Employees will occasionally remark upon the attractiveness or comforts of a plant — when safely out of hearing of anyone connected with its management.

Beyond these two categories lies a third type of attack upon the problem of labor relations, along with public relations in general: to evoke in employees a feeling of pride and personal attachment toward the plant, and by the same token, attract desirable job-seekers and impress the general public. As in all other phases of labor and public relations, design can offer important contributions.

Early New England manufacturers must have taken a good deal of pride in their plants, judging by the careful disposition and attractive lines of their many-windowed, tower-topped buildings. In a later, perhaps more competitive era, plants were apparently regarded as unavoidable encumbrances, without character or dignity of their own and hardly even kept clean like other tools of production. The swing toward the contemporary gleaming structure coincided with the growing independence of labor and with the critical attention of the general public, which frequently found legislative expression.

". . . must start from a new level of bright, spacious, efficient civilization that is vastly ahead of the domestic surroundings of employees." *(The Austin Company, engineers and builders)*

One of the more recent devices in bidding for public favor is the opening of plants for public inspection, often including regular guided tours, to show attractive working conditions, efficient production and painstaking devotion to the excellence of the product. Of course, this device can be used only where the plants are already bright and up-to-snuff; in turn, the institutionalization of public inspection serves as an incentive for further improvements of plant design and housekeeping.

The physical features which will evoke pride in employees and approval in the public begin with the very location of the plant, often in open, green country. Site planning for impressive views and landscaping to emphasize or hide parts of the layout follow with their contributions. Treatment of fences, drives, parking spaces and architectural appearance complete the exterior effect.

In the interior layout, the public relations program will require an impressive reception room, matched from the labor relations point of view by an employee entrance which should be just as bright and dignified and perhaps just a little bit luxurious. Both spaces usually carry a display of company products, often accompanied by highly informative material on the place and contributions of the industry in the national picture.

For the visitors, the reception room should be the starting point of a tour designed to convey a cohesive impression of operations, and emphasizing the best points of employee facilities. The tour should be designed into the plan at the start, since it is essential to avoid interference with plant traffic, distraction of employees at work, or exposure of visitors to hazards.

For employees, a parallel program of orientation is often included in training courses, intended not only to stimulate their pride in the company but also to inform them of the opportunities to find the work most congenial to them and for advancement. This requires classrooms or small auditoria, already mentioned in connection with safety education.

In addition, many industries maintain showrooms and sales suites for distributors and dealers; some, like the automobile and clothing industries, sometimes devote extensive floor space to retail sales as a matter of public relations — catering to a widespread consumer preference to shop at the very source.

In conclusion, it might be said on the basis of some experience, that the architect is exceptionally well qualified to advise the industrialist on matters within the scope of this article. Because he is a member of the consuming public himself and deals professionally with clients drawn from so many walks of life, his notions on how people react to features of plant layout and building design are often more dependable than those of the plant management or even those of single-minded labor or public relations advisors.

CURRENT DANGER IN PENNY-WISE SAVINGS

By E. Warren Bowden, Vice-President of Walter Kidde Constructors, Inc.

Building costs of industrial structures are now 40 to 45 per cent higher than they were in 1940, and, according to some authorities, will skyrocket to 55 or 60 per cent by 1947.

Quotations for materials vary from day to day and are subject to change without notice. Almost all subcontractors are automatically stamping an escalator provision on their quotations which states "we will quote you such and such a price today, but you will have to pay that price plus whatever the changes in labor and material may be from prices in effect now."

But in spite of the high cost and in spite of the difficult and complex problems involved in building today, the volume of new construction will likely reach seven billion dollars in 1946 and twelve billion dollars in 1947. Certainly, there must be some excellent reasons for a manufacturer to build under these conditions. Actually, the present and prospective high cost of wages for production, coupled with the low cost of money, amply justifies the progressive manufacturer in providing efficient quarters for his operation.

When it is considered how small an amount, relatively, is represented by the annual charge for the plant building as compared with the annual cost of wages, it becomes apparent that any reasonable expenditure that will cause an increase in efficiency of labor, will result in an overall benefit to the business.

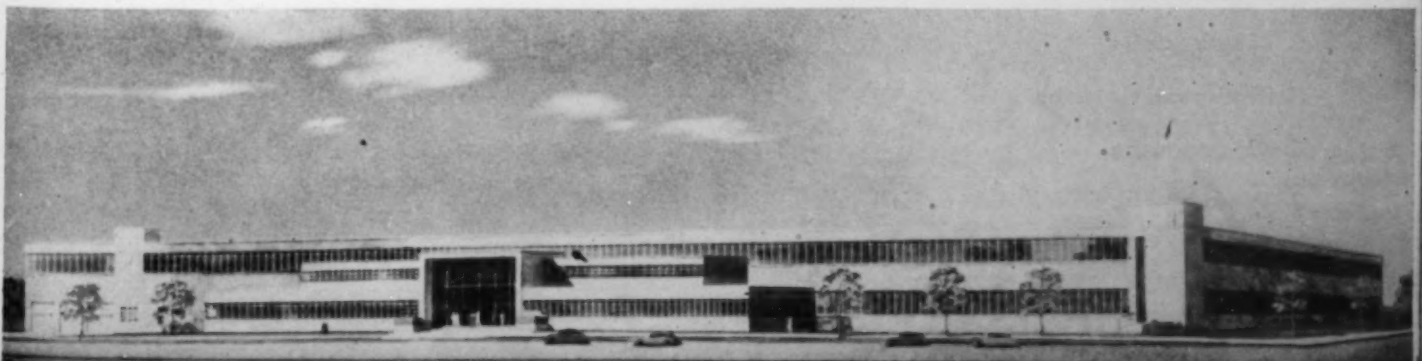
Efficiency in production is governed by a large number of things, and admittedly the most important single factor in increased efficiency is the introduction of more modern mechanical equipment used in the manufacturing process. However, the cost of labor to produce a given product is affected very materially by conditions that exist in the plant itself. For example — in many plants the limitations imposed by an obsolescent design require that the materials in process be carried back and forth without the benefit of mechanical conveyors, and over routes which in a properly laid out plant could be reduced to a fraction of the present travel. If the existing multiple-story plant with limited areas, closely spaced columns and numerous bottlenecks, could be replaced by a properly designed modern plant, a markedly increased efficiency would result. Employee attitude is also an important factor in the amount of work produced, and it is commonly recognized that improper lighting, poor ventilation and the absence of adequate employee facilities may have a very retarding effect on the total output of the finished product.

Of course there is no average plant condition that will be really representative for all industries, and the relationship between wages paid and the cost of the investment in plant varies widely. However, from the experience of construction engineers in what might be called the average type of plant now being designed and built, it appears reasonable to state that the annual charge for interest, amortization and real estate taxes on the plant itself, without manufacturing equipment, amounts to only about one-tenth (1/10th) or less of the sum paid annually for wages of employees in that plant. As an example, one plant in which the investment was about $400,000 employs a minimum of 400 wage earners, at about $1200 each, making a total annual payroll of $480,000. On a 20-year basis the cost of interest and amortization to pay off the full cost of the plant is about $30,000, and taxes on the real estate amounts to an additional $10,000 making a total of $40,000.

If, by building the new plant the owner were able to decrease his labor requirements by as much as eight and one-half (8½) per cent, he would be able to justify it.

There are a number of such instances where studies have indicated that the proposed new plant will pay its complete annual cost in terms of wages saved. One instance of this is a company now renting several loft areas in the New York district, where it is necessary to move semi-finished items from one location to another by truck. The savings effected by eliminating these trucking charges will alone more than pay the annual carrying charge on the new plant. The latter will combine in efficient manner all of the scattered operations.

The wisdom of investment in efficient plant facilities becomes more and more apparent as the compensation paid to wage earners is increased. The relative annual cost of carrying the new building as compared to the greater total now paid for wages not only amply justifies the new building, but indicates very clearly that it is unwise to cut corners and effect minor savings in plant construction which may have an adverse effect on the total plant production.



New plant for Continental Can Co., Utica, N. Y. Walter Kidde Constructors, Inc.

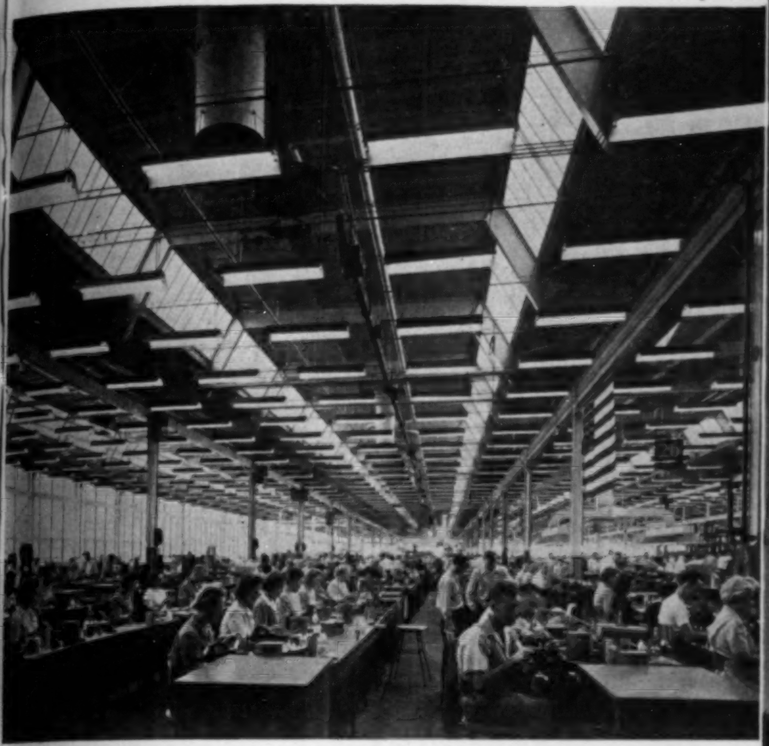
TRENDS IN INDUSTRIAL PLANT DESIGN

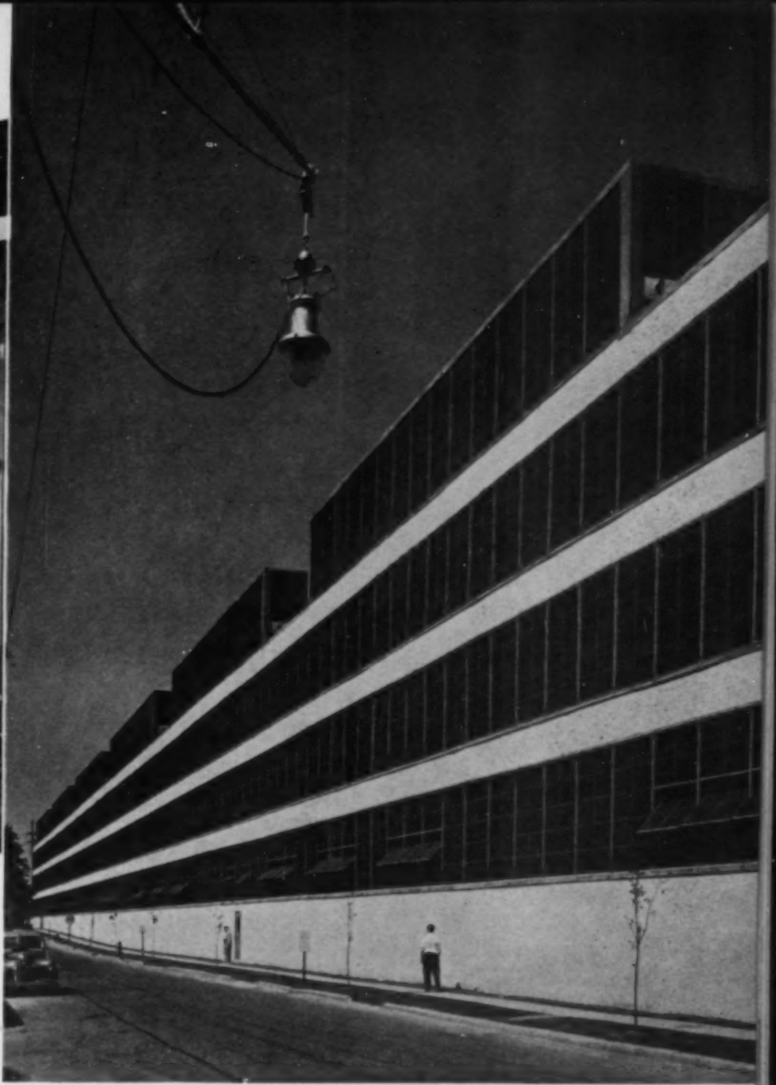
By George H. Miehls

President, Albert Kahn Associated Architects and Engineers, Inc.

1. *Influence of personnel relations on building design*
2. *New materials for construction*
3. *Changes in structural design*
4. *Influence of production layouts on building design*
5. *Roofs and walls*
6. *Column spacing*
7. *Heating and ventilating*
8. *Air conditioning*
9. *Windowless vs. daylight construction*
10. *Interior painting — use of color*
11. *Eating facilities*
12. *Sanitary facilities*
    — washrooms, toilets, lockers, showers
13. *Recreation facilities*
14. *Outdoor facilities*
15. *Parking facilities*
16. *Landscaping*
17. *Acoustics*

Hedrich-Blessing Photos





". . . in an imposing flow of horizontal lines of dignity, proportion and sheer beauty. If the promise implied by an attractive exterior appearance is realized equally by interior appointments, the labor force is likely to be productive . . ."

OUT of our broad experience in wartime construction have come relatively few new materials. There has, however, been much refinement of our thinking. Trends not always clearly defined before the war stand out in sharper relief today. They have to do less with the physical aspects of construction than with what might be called its sociological phases.

Two, among others, that take a pronounced form and definite direction are these:

1. Urgency for designing into a building every possible aid — whether of beauty, utility or facility — to realize the utmost in labor productivity;

2. Attractiveness of smaller population centers as plant sites because of cheaper land, better expansion facilities and more stable labor. In other words, a trend from huge, completely integrated in-city projects to smaller production units employing from 1000 to 3000 people.

1. Influence of Personnel Relations on Building Design: This factor has become of accelerating importance in the past decade, and is now more important than ever, with the end not in sight. It is born of the realization that other factors being equal, the best looking plant in the community will attract, and hold, the highest type of labor. Proper plant appearance and facilities instill pride in workmanship, and build community stature and prestige for the workmen. Adequate employee facilities properly spaced, and arranged according to the sequence of need, lift morale and productivity and cut costly disruptions to production.

Time was when management concern for workers was regarded as paternalistic. It was resented, and there appears a distinct borderline beyond which it may not venture today, of which more later. But while the man is at work in the plant, or injured while at work, or viewing the plant objectively as a member of the community, he is susceptible to every blandishment of management to make him a prouder, happier, more productive workman.

This begins with his first view of the plant on his way to work. If it affords a true concept of American industrial architecture at its very finest, it will interpret the masses required for industrial utility in an imposing flow of horizontal lines of dignity, proportion and sheer beauty. If the promise implied by an attractive exterior appearance is realized in equal measure by interior appointments, the plant labor force is likely to be productive and a community asset. Because most of the factors relating to this subject are broken down further along, they will be dealt with in detail later.

2. New Materials for Construction: Any architect or builder would answer this question by stating his willingness to forego his claim to any new materials if he could only get all the old ones he wants for the next year or two.

Of the new materials, there are few with which we were not familiar before the war. They may be a little further along now, and some are being offered that were only in the prospectus stage before the war. But such materials are in finishes; not structural. We have made very little use of laminated beams and girders.

Aluminum will be more and more used in sash, insulated wall panels, etc. Welding of metal to plywood has been improved. But improvements for the most part have been minor and for the next year or more, or until postwar research and development have had a chance to function, interest will be more on the scarcity of standard materials than on the introduction of new ones.

3. Changes in Structural Design: There is little change indicated here and renewed emphasis is on flexibility. This was vividly illustrated during the war. Of numerous aircraft projects which we designed around the time of Pearl Harbor, every single one was at least doubled in capacity, and some tripled and quadrupled, before the end of the war. This expansion had to be superimposed on existing production so that there would be no interruption in the flow of weapons while plant additions were being made.

This would not have been possible, at least not in the time available, had not original plans provided for just such a contingency. While the likelihood is remote that any similar quick expansion of production facilities will be required for civilian output in the near future, it is a fact that the plant designed for easy flexibility will be best able to take advantage of quick shifts in the market for its product.

To build a project with the expectation that its capacity may be doubled or trebled within the life of the original plant presupposes extensive land holdings for room to expand physical facilities and related services such as parking. This land is obviously cheaper in a small town than a large city. Because of machine technology and job simplification, less average skills are required in industry today than ever before, and industry accordingly need be less concerned with locating in an area of skilled labor reserves. A small community with relatively little industry and a labor reserve of 1000 up to 3000 men can offer an attractive picture to at least certain types of industry. For industry to locate in such a town in turn attracts new people, builds up the community and automatically provides new labor as the expanding needs of the plant require it.

When a plant employing 3000 men goes into a new community with the expectation of doubling or trebling its capacity, it can eventually wind up with total payrolls of not more than 9000 people and thus escape some of the transportation bottlenecks, straining of employee facilities and other non-production burdens which are inevitable in huge concentrations of industrial workers.

4. Influence of Production Layouts on Building Design: The influence here is less than might be expected, assuming a one-story, or one-story and mezzanine type of structure. Here the raw material comes in at one end, moves through the production processes and out at the other end in a continuous line which is so laid out that no part of production crosses another, and material, sub-assemblies and parts will meet the line at the proper place at the proper time. Industries utilizing this principle to the greatest extent make changes in product models semi-annually or annually and the building design must be sufficiently flexible to allow for these changes in production layouts without major building alteration or change.

5. Roofs and Walls: There arises the time honored argument for monitor type construction versus the monitor-

"It seems improbable that we will ever eliminate monitors. Certain operations definitely require the light and ventilation. . . . But studies of the effect of lighting on productivity have resulted in more attention to lighting the individual job"

less type. Many new plants are being designed without monitors; many are designed with monitors. The final decision rests with questions of economy of first cost and operation, psychological effect upon employees, the nature of the processes and many other factors which must be evaluated in each individual case. Studies in lighting have cast doubt on the adequacy of daylight for some processes where it was generally accepted before. Since the question of monitors is largely related to lighting costs, the subject will be examined under lighting.

Roof decks still are of the usual standard items. One company has placed on the market a special metal deck which is zinc coated, "bonderized" and aluminum coated for long life without painting.

The question of roof insulation assumes large proportions and importance. The selection of insulating materials is being constantly broadened, ranging from vegetable fiber boards through fiber glass to cork and foam glass. Cost of insulation must be evaluated in relation to first cost of heating installation and the annual operating cost. Care must be taken to maintain the insulation in a dry state to assure that its properties are not impaired by moisture — it being recognized that some insulation mediums are more affected by vapor pressure than others. To obtain the best results from insulating media, and a proper return on the initial investment, each material must be evaluated on its heat transmission value, the cost of maintaining that heat transmission value, and its first cost.

6. Column Spacing: There is little foreseeable change here. The ideal, of course, is no columns at all. But the industrial architect must always compromise the ideal with cost factors. We of necessity went to 76-ft. bays in some war projects, but for all-around utility, flexibility and economy in a one-story layout, we preferably stick to the 40 by 40 or 40 by 60-ft. bay as a representative layout for economy and flexibility.

7. Heating and Ventilating; 8. Air Conditioning; 9. Windowless vs. Daylight Construction: Since these subjects are all inter-related, they will be discussed together. It is also necessary to weigh them together because the saving effected by a given procedure in one of the three factors may be offset by negative in the other two. For example, to install a flat roof instead of monitors will effect a material saving in first cost of construction. But provision for ventilation and lighting to make up for that lost through lack of monitors may completely neutralize the saving. Every project must be weighed from the overall cost standpoint.

It seems improbable that we will ever eliminate monitors. Certain operations such as foundries and forge hammers definitely require the light and ventilation they provide.

But in general manufacturing areas, studies of the effect of lighting on productivity have resulted in more attention being given to lighting the individual job than the general area. On jobs requiring a high degree of lighting, or constant light, daylight must be supplemented. When artificial lighting is provided, experience has shown that it will be largely used even though not needed. If a drifting cloud shuts out natural daylight even momentarily, the artificial lights are immediately turned on, and once on are not turned off regardless of the adequacy of natural daylight a few seconds later.

Since the current, maintenance and installation costs of artificial lighting are thus a part of the project, it seems needless to burden it with the additional cost of monitors. Monitors were adequate when 20 footcandles were considered sufficient for general factory lighting. But today some processes require up to 50 footcandles, and 35 to 40 footcandles are regarded as the minimum for a general manufacturing area.

Without monitors, expanse of window sash is materially reduced and brings up the question, "Why windows at all?" We do not believe the ultimate will ever be reached because day workers want to see outside. In wartime blackout projects, workers scraped peepholes through the paint, and we had reports of their throwing wrenches through the opaqued windows to get a look at the weather outside. Hence, while window sash may be further curtailed, we believe it vital to provide at least a vision band of sash in the sidewalls at the eye level.

Without monitors, provision for supplementary ventilation must be made, and it is important to see that exhausted air is balanced by an equal supply of fresh air to avoid a partial vacuum within the work area.

While air conditioning is going increasingly into offices, we do not look for it in factory areas for some time unless temperature and humidity control are vital to the production process. Again it is a question of cost weighed against productive results, and the economic scales are not yet tipped in favor of the installation.

The other related factor of heating brings up the intriguing new subject of radiant heat. Our experience with it to date indicates that it may have a wide accept-

"Here the raw material comes in at one end, moves through the production processes and out at the other end in a continuous line . . . no part of production crosses another; and material, sub-assemblies and parts will meet at the proper place and time"

ance in a variety of industrial building applications.

It seems particularly suited to heating high areas where comfortable working temperatures are required at the floor level, such as airport hangars. The heating coils imbedded in the concrete floor radiate heat upward to the working areas, and mechanics and others at or near the floor level are not affected by the loss of heat in the higher areas occasioned by the frequent opening and closing of the hangar doors. Loss of heat may also be reduced by throwing a curtain of hot air across the exposed area when the doors are opened.

We have recently completed an installation of radiant heating in a general office building and are watching results.

10. Interior Painting — Color: Experts now giving intensive study to this subject promise conclusions which may necessitate a revision of our thinking. Until the past year we felt that the lighter colors, such as buff instead of machinery gray, with a higher reflectance value, would improve lighting, ease eye strain and consequently lift worker morale. Some plant owners even tried painting floors white, but, like the white line in the middle of the highway, they did not last very long. It now appears that light colors are less effective than blending colors. There is a natural affinity of certain hues and tints, and a natural clash between others. If research bears out the point, the problem will be to arrange a natural sequence of blending color, from work bench, to machine, to surrounding walls for eye-ease and clashless sight.

11. Eating Facilities: This is such a tremendous factor in employee morale that it is a specialized study in itself. In many war plants, surrounded by trailer camps and similar temporary housing facilities, workers ate all their meals in the plant, and the opportunity here for improving worker morale and health by proper feeding in attractive surroundings is obvious. It is equally obvious that because of the importance of the food factor, not only on morale but on productivity, management will feed its workers better on the job than they eat at home.

Out of the whole broad subject, several generalities may be made: Separate facilities should be provided for office and factory workers, because a bench hand in dirty clothes does not want to soil the dress of a stenographer any more than she wants it soiled; while lunch wagons clutter up plant housekeeping, they frequently provide a worker with his only breakfast and to discontinue them will lower productivity; tables seating four will feed more people on given floor space than benches.

It is important that ample facilities be provided, so that workers may be served in the shortest possible time, minimizing waiting time — and allowing thereby a more leisurely eating period. Each operation presents a different problem, but the solution has a material effect on employer-employee relations and productivity.

"It is equally obvious that because of the importance of the food factor, not only on morale but also on productivity, management will feed its workers better on the job than they eat at home"

12. Sanitary Facilities: Here again the effect on morale and productivity is great, and can be demonstrated concretely in the instance of toilets. Assume that they are inadequately spaced so that workers must walk more than 200 ft. Aside from the fatigue factor, they will waste a minute or more a day, which in a plant of 2400 men means a minimum of 40 hours daily of production time paid for but not realized.

We favor wherever feasible bringing the men into the plant at the basement level and locating all facilities there, such as lockers, washrooms, toilets, showers (which experience shows will be seldom used except in foundries), time clocks and similar facilities. Where bedrock or other conditions rule out the basement, the mezzanine is second choice.

The reason for preferring the basement over the mezzanine is that stairs are generally fewer and supervision generally is better. Toilets, however, are now generally being located on the mezzanine for even closer supervision than is possible at the basement level during the working shift.

Either arrangement will keep the production floor clear, a desirable factor in housekeeping, but much more important in achieving the flexibility so necessary on the production floor when layouts need to be changed to accommodate new models or processes.

Employment and personnel offices, plant hospital or first aid, and similar services may also be located in the basement, although frequently it is advisable to house them in a separate building in order to divorce job applicant flow from employee traffic.

Plant hospitals follow a widely varying pattern. Some war plants had facilities almost equal to a small general hospital, which seems far beyond the need or economic reach of private capital. For the most part, the facilities required to give job applicants physical examinations should be nearly ample for the in-plant treatment of workers, where the community provides general hospital service.

13. Recreation Facilities; 14. Outdoor Facilities: On one war project, we were asked to lay out baseball diamonds; on another, recreation rooms; on still another, a dance floor complete with orchestra where workers could dance during the lunch period.

All this was well enough while sponsored — and paid for — by Uncle Sam, who was not concerned with competitive costs and against whom there was no paternalistic resentment. But we question whether average workers would take the same attitude toward private management. We do not believe such facilities would be sufficiently patronized to justify the cost. Average workers want to do their job in the shortest possible day, and get away from it as quickly and completely as possible for the rest of the day.

Consider the attitude toward showers, for example. We have been asked to include them on projects where their need or utility was debatable. Our experience has been that where the work is only moderately dirty, in contrast to foundries where showers are essential, very few workers ever stop to take a shower at the end of their shift. They want to get home immediately, take a shower there, and get into clean clothes.

We do not believe they would be any more disposed to use plant recreational facilities, either indoors or outdoors, unless the plant was remote from any community recreation. In such extreme instances, it would certainly be desirable and almost obligatory on management to provide such facilities.

But for a plant in a built-up community to attempt to provide bowling alleys and recreation rooms for its workers would almost certainly run against the paternalistic resentment of labor and of competing private enterprise.

While we know of no instance where theater operators have protested the in-plant running of movies during the lunch hour, there is always that possibility if such programs are allowed to get too elaborate or switch from educational themes to entertainment. Many plant cafeterias are now equipped with projectors and screens. There is no question of the relaxation value of short films, although the noise factor is generally a neutralizing element.

15. Parking: Workers realize that if they live remote from the plant, it is their responsibility and the time spent in transit is their own loss. But from the time they turn into the plant parking lot until they punch the time clock, they blame any undue delay on management, and rightly so. Similarly at the end of the shift, any interruption between punching out and getting on the open road on the way home they resent as time stolen from them and their families.

We are constantly striving to cut this lost time interval. Flanking arterial highways should be adequate to carry the sum total of cars on the two largest shifts, which will be the plant traffic peak. Generally one-way movement through the lot is best, with entrances and exits on separate highways.

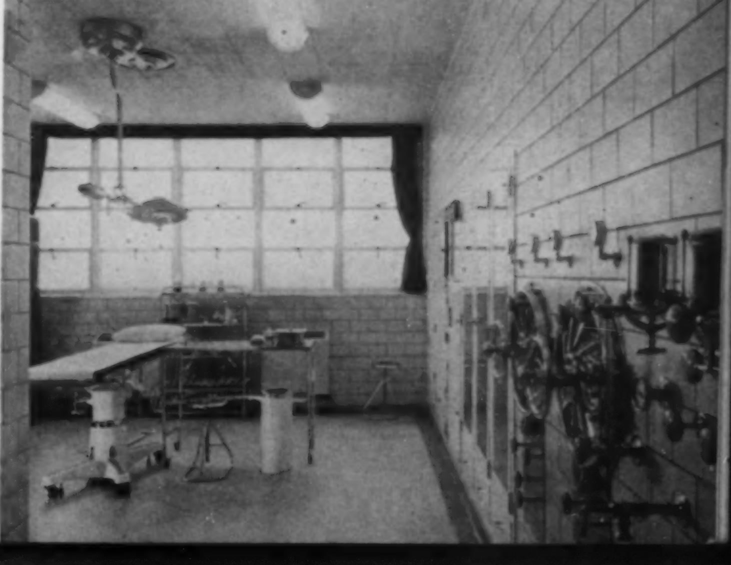
The ideal arrangement would permit the worker to drive into the lot, park, and proceed on foot on weatherproof surfaces into the plant as quickly as though he were the only patron of the lot. Walking distances should be as short as possible, and for this reason two or more small lots contiguous to the plant and opening into it are preferable to one large lot. Any trafficways between lot and plant should have pedestrian over- or underpasses for quick and safe passage.

Workers who use public transportation should have sheltered waiting rooms connecting, if possible, directly with the plant. Provision for public bus parking or streetcar turning, in the most convenient arrangement for employees, should be an integral part of the scheme.

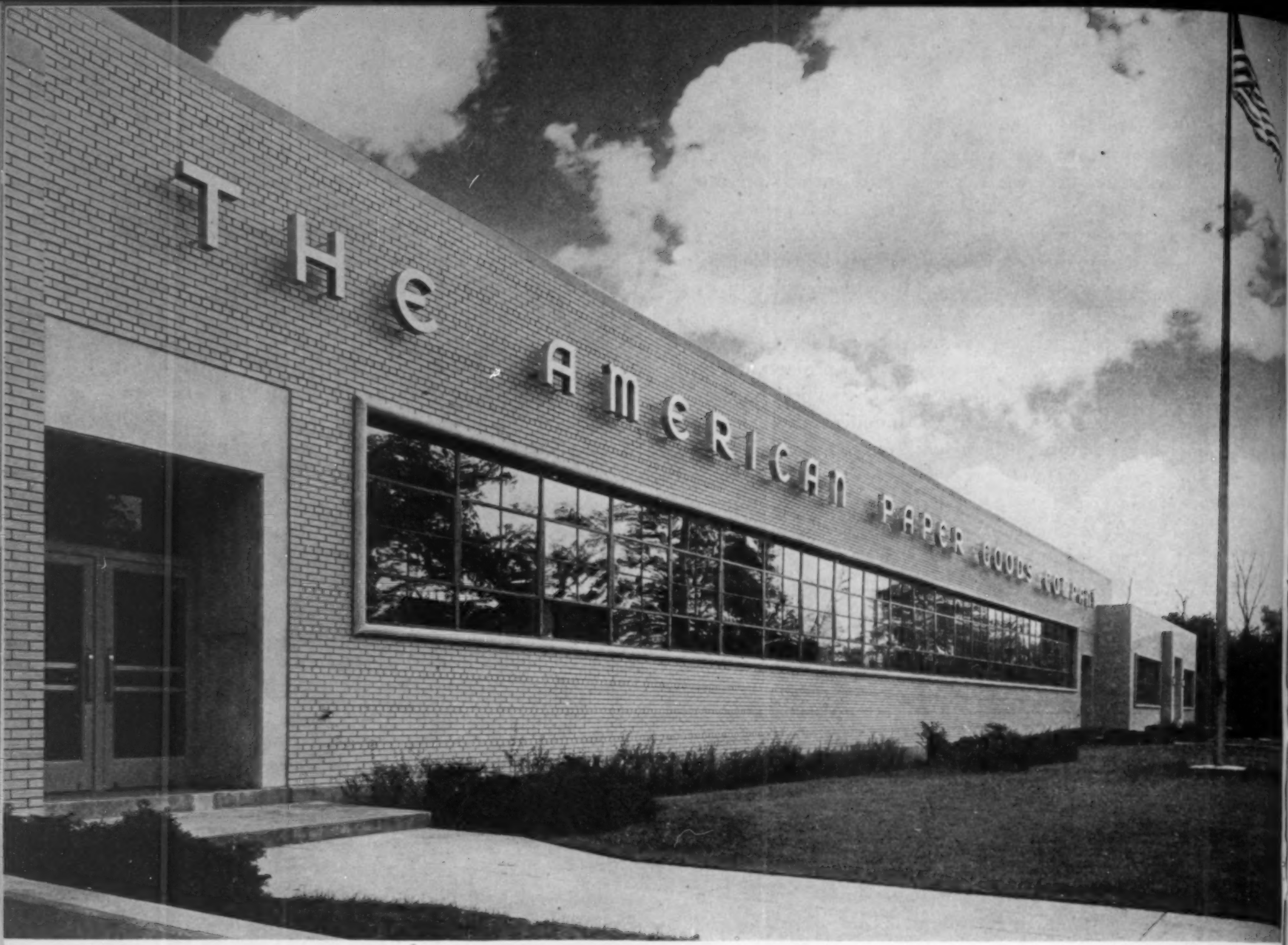
16. Landscaping: There is no question of the public and labor relations value of a beautiful plant in an attractive setting. If the location is remote from the city, much can be done in the original plans to heighten the beauty of the project. But wherever it is, the maintenance cost of preserving the attractiveness of lawn, shrubbery and trees runs high. Landscaping is purely a question of the willingness of the owner to spend money for an intangible asset.

17. Acoustics: One subject not yet covered is study of noise reduction in the plant. Since the acoustic factor is always considered in the general office plan, it would seem equally desirable to consider it for the work area. Some progress has been made in using perforated cylinders to pick up sound and lower the noise level. There is thinking along the lines of treating the individual machine rather than the general area. This grew out of experiments in a machine shop where it was virtually impossible to hear over the intra-plant telephone. By partially enclosing it in a "booth" consisting of a 3-sided box of perforated acoustic material, reception was good beyond expectations. Sound engineers reason that a similar booth fitted around three sides of a machine, where it will not interfere with the production operation, should work equally well in arresting noise before it reaches the general area. The ultimate objective, like the many phases of employee relations already mentioned, is to eliminate noise as a negative factor in working conditions, for improved morale and productivity.

Apart from the items here covered, we feel that the greatest single influence on factory design and construction at least for the next year will be availability of materials. The situation appears to be getting worse rather than better, with no complete relief in sight until the balancing forces of supply and demand again flow freely in our economy.



"Plant hospitals follow a widely varying pattern. Some war plants had facilities equal to those of a small general hospital, which seems far beyond the need or economic reach of private capital."



Hedrich-Blessing Photos

A MEASURE OF MODERN EFFICIENCY

Plant for American Paper Goods Company, Chicago

The Austin Company, Engineers and Builders

When this client faced the question of carrying out a new building project or enlarging its old quarters, a little figuring soon showed the wisdom of going ahead with the new plant. Although the proposed building would contain less that 20 per cent more area than the old, it would permit a 100 per cent increase in employment, and a 250 per cent increase in production.

Comparative figures tell part of the story:

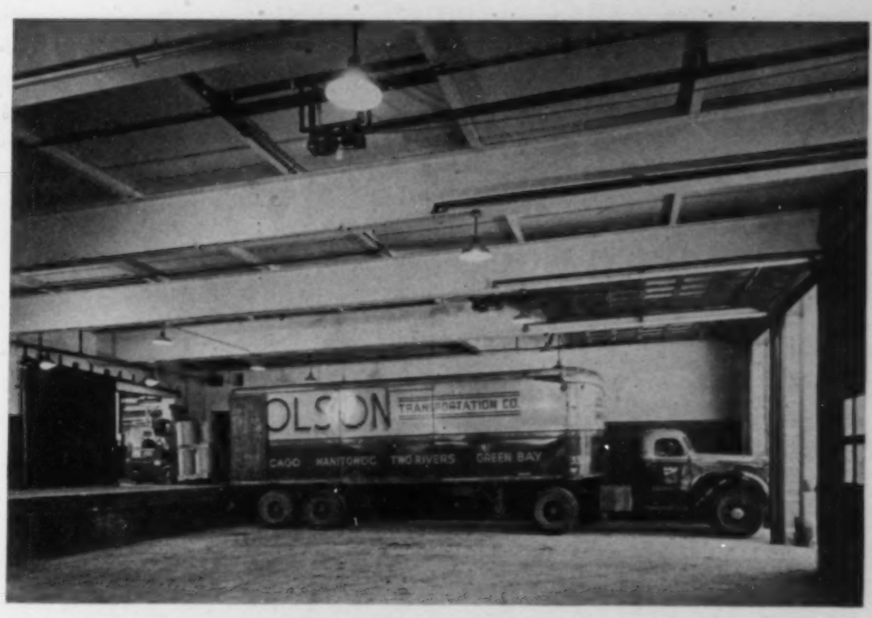
	Old	*New*
Gross square feet	102,000	120,000
Net square feet	84,000	119,000
Waste square feet	18,000	1,000

Usability of the space is still more telling. Aside from the waste space in stairs and elevators, there were columns 2½ ft. in diameter and spaced 14 ft. apart. The new building has 8-in. steel columns, with spans of 30 to 40 ft. And the clear space is arranged for straight-line production with the newest factory equipment.

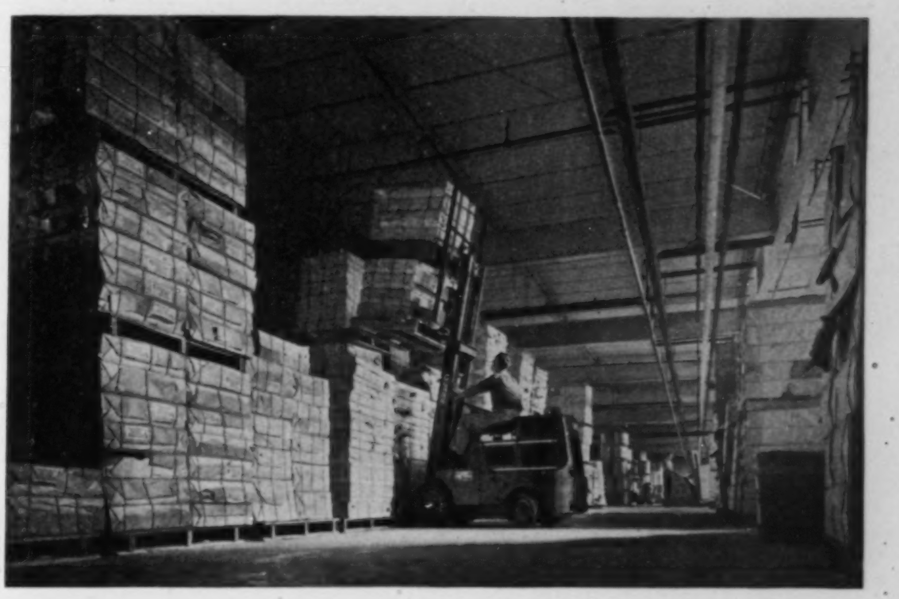
In the face of such a comparison there could remain no question of trying to salvage the old building. Costs of new construction would have to be higher than they were, or are, to deter a client from building. In a time of increasing labor costs, such production efficiency increases in value out of all proportion to rising construction costs; thus economics actually favor construction of any facility that will make any contribution to production efficiency.

The client here was conscious of employee matters in other respects as well. For example, original plans called for employees' entrances in the conventional rear or side locations; at the client's request the entrances were moved to the front, so that "all should enter the building by the front door, the same as they do at home."

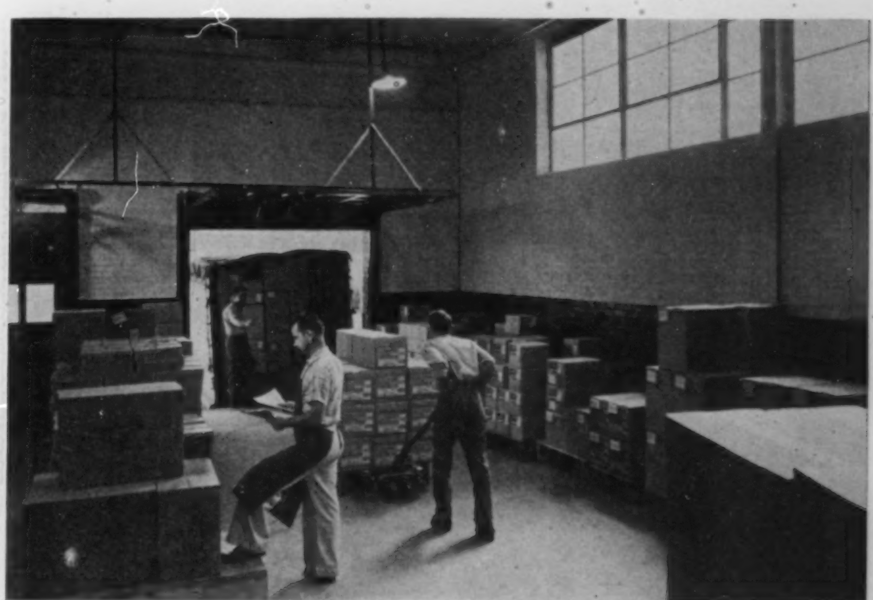
Employees have responded interestingly to the new, well-lighted, attractive interiors — "white collar" workers have been applying for factory jobs. "Factory pay is higher than what they can get in office jobs, and the



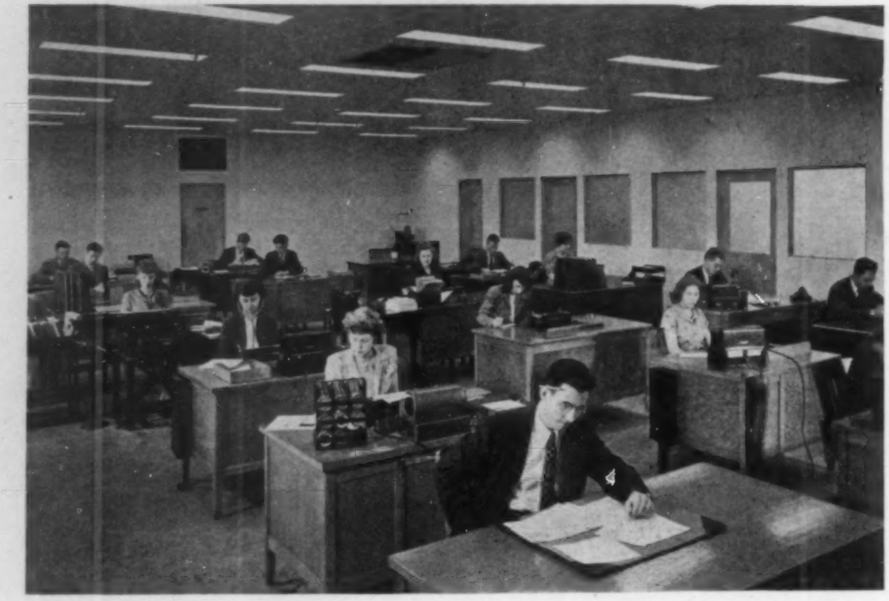
Built to accommodate the large trucks that bring paper supplies down from Wisconsin, the truck court has outside and inside doors, to protect paper during wet weather. Vents in platform for the exhaust gases



Square feet being translated into cubic feet. High ceiling heights and clear aisles permit use of fork-type lift trucks to stack loaded skids. Still more important than the space saving is the economy in time



The finished product goes out just as easily as the raw materials come in. This is not the same loading platform as shown above; this one is at the other end of the plant, to keep truck traffic to a minimum

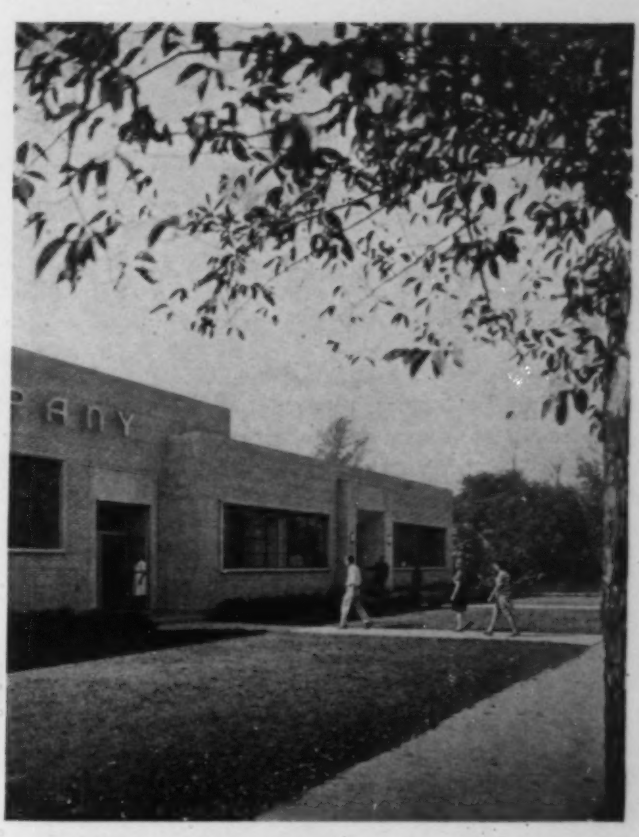


Sound-treated ceiling and recessed fluorescent lighting of 35 footcandles, plus air conditioning, make for comfortable working conditions in the office portion. Sprinkler pipes are concealed in ceiling

Democracy in the factory is carried further in the women's lunch room: office and factory workers eat together. In this small plant there is no cafeteria, but the company provides free coffee for the girls

Selecting a site next to the county forest preserve, the company was not unmindful of recreational possibilities. The baseball games, a daily lunch-time activity, are entirely on the initiative of the workers factory working conditions are so clean and desirable that they meet the standards set by white-collar people."

A similar trimness in exterior design has had two effects. Besides contributing to the dignity of employment, it has removed some earlier apprehension in the neighborhood about having a factory located there. The site is an outlying plot between a residential district and the county forest preserves, where, incidentally, employees gather for pick-up ball games in the noon hour. Employee approval of the site was noted in the fact that, even though it was several miles from the downtown location, 85 per cent of the workers kept their jobs.



Right: it was not by accident that the employee entrances were placed at the front. Office portion in the background has its own entrance. Below: the orderly row of printing presses, with the wide aisle for skid-truck paper handling, is a good illustration of the advantages of the wide column spacing in the modern plant

DESIGNING THE SMALL INDUSTRIAL PLANT

By John Cromelin

Architect, Clearing Industrial District, Inc., Chicago

ON a sunny Sunday afternoon in Chicago it is not unusual to see an automobile cruise slowly past one of our Clearing factories, and perhaps come to a stop. It will be a factory worker showing his family "the nice place that our company has."

If it gives an architect some smug satisfaction to see a worker thus proud of his "place," and I assure you it does, we feel that our clients, the manufacturers, can realize their satisfaction in more tangible terms.

To the plant management it means that here is a satisfied worker, a good "company man." His pride is a plus value beyond all of the solid economics of plant location, layout and equipment. It is, of course, a plus value in better workmanship and increased production. Now to a large extent such a worker is probably born that way — he is naturally one who responds to efficient, pleasant working conditions. However important it is for the factory building to bring out this response, we feel that the most important thing a good factory building does is to attract that sort of employee in the first place. In short, the best buildings bring the best workers.

That is as good a place as any to start a discussion of the postwar small industrial building, for if there is any evident trend toward better design it shows itself first in a greater appreciation of those elements that improve the welfare of the worker, and increase his interest in his workshop. Perhaps the only thing that is new is the degree to which this appeal is effective. In the word, "appeal," I am thinking of the task of the designer in working for the manufacturer-client, and I am thinking most especially of our own job here at the Clearing Industrial District in attracting new industries to our industrial subdivisions. We are now building quite a few new small industrial plants, and planning still more, and I am sure that management generally will need all of the plus values that the designer can give him, in order to keep its plants profitable in the years ahead.

Right at the beginning I should say that I don't think there will be any sweeping, revolutionary changes in industrial buildings. There will be, as always, a fairly steady flow of new materials and new ideas, perhaps at an accelerated rate, and it seems likely that we may expect a readier acceptance of obvious improvements. But we shall certainly not depart from the basic laws of economics, the primary needs of space, transportation, efficient process layouts, economical materials handling, and so on. These will remain the all-important considerations in the design of industrial buildings.

At any rate, here at Clearing we don't see any reasons for departing from the basic ideas of plant layout that we have developed in building some 150 small plants over a long period of years. While there is a wide variety of plants in our industrial subdivisions, and improvements are always developing, there are certain features common to nearly all of them. And these features do come together to form a sort of standard pattern for a small factory building.

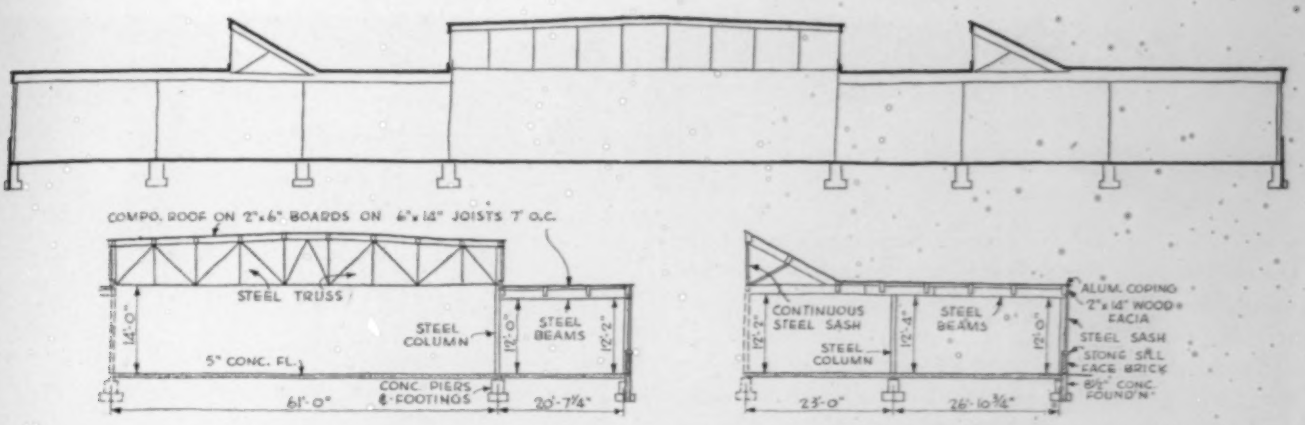
In the design of a new plant, there are rather compelling reasons for starting from a standard pattern. The modern industrial building, like the modern office building, is a comparatively recent development; so recent that it is difficult to predict the useful life of either. Plants built today, if given proper maintenance, may still be in use forty or fifty years from now. An industry may well outgrow its premises long before that. Or changes in manufacturing technique may render a particular building obsolete for a particular industry.

Factory managers know that once a plant becomes in-

Hedrich-Blessing Photos

AMERICAN BOX BOARD
COMPANY
5950

This plant shows several evidences of the standardization approach — the clean office portion, the high bay, the sawtooth. Not typical is the cantilevered truss. Vern E. Alden, consulting engineer



Standard bay units which Cromelin uses as base points for a new client. Since these units, assembled as in the upper diagram, would serve many industries, an effort is made to keep the new design close to the pattern, as a safeguard against obsolescence

efficient for its special operations, it is cheaper to scrap the building and start over than to continue trying to operate in it. If this well known truth seems to suggest just the opposite of *standardization*, it certainly suggests also considerable study of design factors that make for *flexibility of use.*

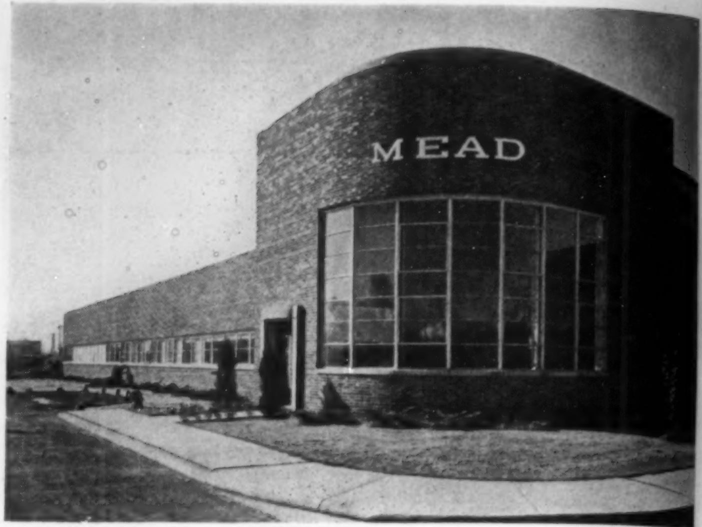
Flexibility is, then, the first objective of the designer. Suppose that it is not possible to avoid obsolescence for the one business; it may still be possible to come close enough to a standard pattern so that the building will be perfectly good for many other industries. I submit that this is an excellent approach to the problem of obsolescence: the manufacturer can sell the building and thus have comparatively little to write off when he has outgrown the plant, or when his changing needs make it obsolete for his own purpose.

Here at Clearing we have our especial reason for this approach. The Clearing Company develops industrial districts, and builds factories for lease or sale. It has a going, growing group of industries, and it doesn't want abandoned plants or plants of limited utility. More important to the company as a landlord is the fact that it has been able to avoid them. There have frequently been changes in use. There have been rapid expansions, failures, process changes and many other reasons for the turnover of a particular plant, but rarely has there been any difficulty about it.

The little section drawings with this article illustrate some important things in the standard pattern to which we work. They show two units of high and low factory bays, which can be put together in various combinations in the same building, as for example in the diagrammatic section.

Most industries like to have one fairly wide bay with a high ceiling, a sort of nave in the center of the building. This space might, for example, be the final assembly line, or what corresponds to it in the smaller plant. Even if the particular industry did not require this high bay, it would be good to put it in. With a standard, inexpensive truss such as is shown, this high bay would cost only about 3 per cent more than the same space with lower ceiling. Certainly a small premium for increased flexibility.

Then lower bays, perhaps with shorter spans, can be



Another of the newer Clearing plants, this one for Mead Specialties Co. The high lobby next to the main entrance is for display of an ice-boat. Not typical are wood purlins and poured gypsum roof

added along the side as desired. Some could well have the saw-tooth device for skylighting. And these standard units can be added easily, side by side, as the plant tends to expand.

Experience indicates that 30 per cent of high-bay space is a good average for the typical small industry. And any building over 30,000 sq. ft. should incorporate the high space. The monitors run east and west, instead of north and south, to avoid the glare of the late afternoon sun.

The column space of 61 ft. across this high bay is not too expensive and is adequate for a wide variety of industries. Column spacing in the other direction might be 24 ft., and, of course, the length of the building could be anything. Column spacings in the low-ceiling areas are not usually too important; they run in our buildings from 20 to 30 ft.

Planning for expansion is, of course, another standard item. Almost all industries do expand; land is cheap compared with buildings; and avoiding obsolescence by providing room to expand is an obvious and simple precaution.

As a matter of policy, we try to avoid multi-story construction. About 80 per cent of the industries in the various Clearing districts have come from multi-story buildings, and none of them wants to return to them. The development of mechanical handling systems has made it possible for such industries as paint, cosmetics, etc., to function perfectly well in a monitor type building, with lower first cost and increased flexibility.

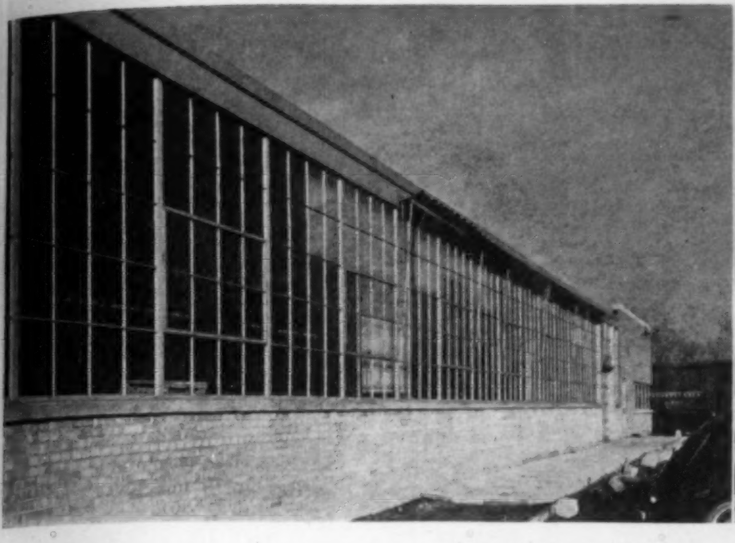
Another general requirement is transportation. Not all small plants require switch tracks. About 75 per cent of the factories in our group have them, and the other 25 per cent are arranged so that tracks can be installed in the future. But all do require truck docks. We do not go so far in the effort to achieve flexibility as putting in switch tracks not immediately required, but it is a good idea to be a little extra generous with truck facilities. Putting docks in extra locations is also good insurance, and tends to help the sale to another industry if that should prove necessary. Due to the rigors of the Chicago winter, the majority of our switch tracks and truck docks are brought into the building.

Office space is also a standard requirement, but here it is not so easy to prepare for other industries. There is, in other words, less possibility of standardizing office space requirements. In our experience, however, this factor has rarely been a serious obstacle to conversion of use; it is usually possible to develop factory space for office purposes.

It is possible also to develop the office space itself for considerable flexibility in partitioning and use. Our practice is to use continuous bands of window sash, arranged on a 4-ft. module. This makes rearrangement of interiors a simple matter, gives good light, and makes for logical, clean exterior design.

Parenthetically, this matter of exterior design is not something to be dismissed as unimportant. With all of the study that goes into the economics and efficiency of factory space it is easy to neglect the human aspects of a building in which executives, stenographers and workmen use their abilities and energies in the important task of life. All of them want a place in which their efforts will seem to have a certain dignity, in which they can work with some feeling of pride. That is an essential ingredient of morale. Good design is not usually a mat-

A. H. Hyndman Co. plant for manufacture of small electrical parts. Angling lot lines suggested this treatment of the front. Here wide spans were not necessary, but standardization suggests them



ter of cost, indeed it costs virtually nothing, but it exerts a power to which everybody responds.

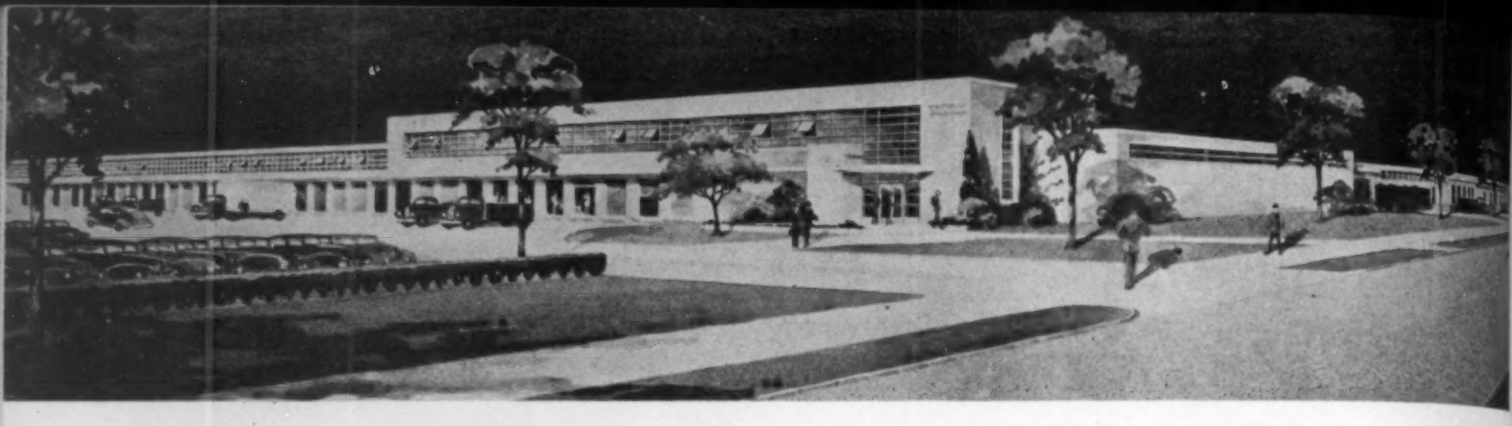
And now just a few notes about construction and equipment. These, too, have gradually tended toward a standard pattern, though naturally the pattern does change gradually all of the time.

For factory floors we use a 5-in. concrete slab, with a wire mesh reinforcement. This floor is adequate for a live load of 1,000 lb. per sq. ft., and is suitable for most types of operation. Some clients ask for wood block floors, but few are willing to pay for them.

Lighting is almost all fluorescent. Most companies are installing enough lighting to provide about 25 foot-candles now, but are putting in wiring sufficient for double that intensity. This is usually plenty for general lighting, but naturally there are many installations of local lighting for special tasks.

Air conditioning and radiant heating installations are becoming more and more frequent in the newer plants. A number of them have radiant heating in the office space, and at least one client — a manufacturer of heating equipment — has insisted on it for all of the factory area. Air conditioning is coming in similarly. It is getting to be almost standard practice to install ducts for air conditioning in the construction of the office portion, usually with the actual installation of cooling equipment waiting for a later date.

The trend to more and better facilities for employees is rather marked. As most of the plants here run under 300,000 sq. ft., the matter of employee facilities does not usually involve anything very intricate in planning. Usually it is a matter of general thoughtfulness, or higher standards in the usual things, of better, brighter design. Better locker facilities and rest rooms, and generally more comfortable, more pleasant surroundings; these are gradually getting more attention in both old and new plants. And if this trend in design has the effect of inducing more employees to exhibit their "places" on a Sunday afternoon, all will agree that American enterprise is not whipped yet.



A STANDARDIZED DESIGN FOR LOW COSTS

The H. K. Ferguson Company, Industrial Engineers and Builders

Many manufacturers have delayed building programs because of what they considered too high construction costs for the facilities they had in mind. This has been especially true when they have been interested in warehousing or some light manufacturing operation which could either be delayed for the present or accomplished in existing, though admittedly undesirable, quarters. Confronted many times by clients with the high-cost argument, The H. K. Ferguson Company set out to develop a low-cost building.

The result is a structure described as "a minimum requirement directed primarily toward a goal of low first cost without sacrificing any desirable features essential to low-cost maintenance or satisfactory production layouts." The building, according to Ferguson estimates, can be constructed in today's market for $3 per sq. ft., in areas greater than 250,000 square feet of floor space. This is a considerable reduction on existing costs, which for conventionally-designed buildings usually range from $5 to $7 per sq. ft.

Ferguson's economies in this structure are predicated on design simplicity. The low-cost building contains no building extras, although it is a modern, fire-resistant, steel-frame structure with interior building services that include its own boiler plant, lighting, ventilation, heating, plumbing, sprinkler and drainage systems. Quality in materials has not been sacrificed to achieve low cost in either construction or maintenance.

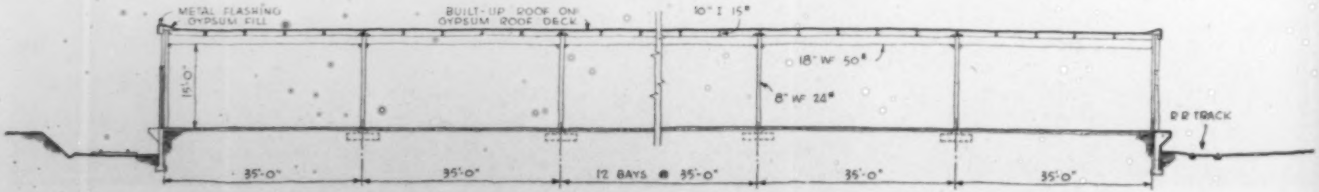
As much as possible, Ferguson engineers have employed the mass production principle to cut costs. By using a dead level roof, for example, great economies can be effected in the fabrication and erection of structural steel members. All similar members of the steel frame such as columns, purlins and beams are exact duplicates — thus allowing fabricators to set up production runs when turning out these components. The level roof in itself is a desirable feature, because it can be flooded in summer with consequent cooling effects.

The steel frame, in addition to its simplicity, has been designed to employ only 5.2 lb. of steel per sq. ft. of floor space, contrasted with 7 to 10 lb. normally used. But it must be emphasized that this minimum use of steel does not allow overhead loads such as conveyors or chain hoists to be supported by the framing. Special loads of this type would require additional steel at extra cost. Bay spacing between columns, however, is 24 ft. by 35 ft., sufficiently generous for warehousing and practical for most types of light manufacturing.

Further economies in cost stem from other utilizations of simplicity and mass production methods. All interior footings are identical, and so are all wall footings, a factor which permits reuse of concrete forms over and over with resultant savings in material and labor. The same principles apply to heating, general lighting, plumbing, sprinklers and sewers. The duplication of identical installations in bay after bay permits a maximum of cheap shop fabrication and a minimum of field labor during erection.

Ferguson engineers stress the point that the building is not a cure-all, but rather a way to provide minimum floor space requirements. They believe it can best be employed for warehousing, machine shop or light manufacturing operations that do not require special design around a certain process.

The three-dollar cost also assumes a clear, level, unobstructed site with soil conditions adequate for soil bearing capacity of 4000 lb. per sq. ft. No yardwork such as railroad sidings, sewer water lines, fire lines outside the building, paved parking areas or landscaping have been included in the base price.



ARCHITECTURAL ENGINEERING

TECHNICAL NEWS AND RESEARCH

AIR CONDITIONING SYSTEMS FOR RENTAL BUILDINGS

by George W. Meek[*]

Basic objectives of multi-room air conditioning are no different than those of most other types of installations. Temperature, humidity, air motion, cleanliness, and odor level should be controlled to such an extent that the room occupant is unaware of these factors. There is a considerable difference, however, in their methods of accomplishment.

When the application engineer selects equipment for a dress shop, theater, or auditorium, there are not a great number of possible combinations of equipment for him to consider. A building of 10 or more floors, on the other hand, may call for the appraisal of at least 12 entirely different arrangements (see following pages for a comparison of the various systems).

Sometimes the thought is expressed that only basic apparatus design, that is, heat transfer, air flow, compressor design, etc., are fit subjects for engineering discussions. The author submits that the reputation of the engineering profession is influenced to an even greater degree by the success with which the application engineer utilizes equipment to produce "an absence of discomfort" than it is by perhaps five or ten years of strenuous effort to increase a fin coil heat transfer rate, even though such effort is crowned by the spectacular success of a 100 per cent increase. The sheer size of capital expenditure in air conditioning multi-room buildings, such as apartment houses, hospitals, office buildings, and hotels, makes it even more important that engineers and architects first be familiar with all of the more important equipment combinations, and second know intimately the strong and weak points of each for various types of installation.

EQUIPMENT SELECTION

Seldom will it be found that there is only one equipment combination which will produce a quality installation in a multi-room building. Usually two or more approaches, and sometimes quite different ones at that, are theoretically capable of producing a satisfactory installation. The results in each case may depend largely on an intangible that might be called the architect's or engineer's "professional proficiency." No mysticism is intended, but the fact remains that due either to previous experience, education, or sheer difference in professional ability, two engineers or architects may each choose a given equipment combination and get different results. The author cannot hope to point out methods of overcoming such a situation, but examination of published literature shows that there is need for a simplified summary of the many apparatus combinations which must be considered for multi-room buildings, and need for an attempt at a still further analysis of the advantages and disadvantages of each.

The data on each system is presented in tabular form on the following pages primarily for the sake of comparison, even though this arrangement has the disadvantage of limiting comments on those little details which sometimes mean the difference between an outstanding and a mediocre installation.

In regard to the ratings under Item 5 (Relative Considerations), it is obvious that at best the comparative rating (A for best, B, C, etc.) is only a general guide. Actually, the author reluctantly includes Item 5c which is an all-round evaluation of performance.

There seems to be a very definite need for an evaluation of the overall performance of the many systems described on the charts. One must realize, however, that the ratings are extremely relative, and due to individual job considerations may vary through ratings of A to almost D, even with one given type of equipment. In some instances, the importance of one or two considerations may dictate the choice, even though that choice carries a very low rating on other considerations. For example, a hospital arrangement may place such importance on Items 5g (least machinery in a room), 5j (noise level), and 5k (recirculation of air between rooms) as to dictate the selection of a system which has less than an overall A rating.[†]

DESIGN CONSIDERATIONS

An engineer, architect, or installing contractor may have had years of experience in the design of systems for dress shops, department stores, theaters, individual offices, and all types of industrial applications, and still be unaware of several important aspects of the problem of applying air conditioning to large multi-room buildings. Some of these aspects have their basis in what might be called the psychology of the occupant, but others are a direct outgrowth of special conditions which are not encountered in the many other types of air conditioning installations.

(*Continued on page 116*)

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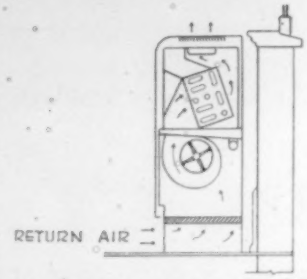
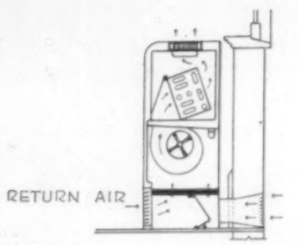
[*] *Consulting Engineer, Syracuse, N. Y., who presented this subject in a technical paper before a meeting of the American Society of Refrigerating Engineers.*

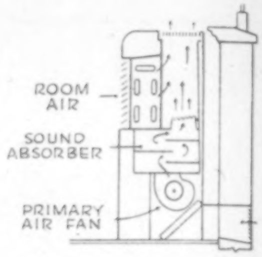
[†] *Central apparatus layouts for systems which require centralized cooling, heating, humidification, dehumidification, and air purification, are given in considerable detail in Chapter 43 of the 1946 issue of American Society of Heating and Ventilating Engineers Guide, in Section 60 of the 1946 issue of the American Society of Refrigeration Engineers Data Book, and in Modern Air Conditioning, Heating and Ventilating by Carrier, Cherne, and Grant.*

COMPARISON OF INDIVIDUAL ROOM AIR

FAN TYPE UNITS



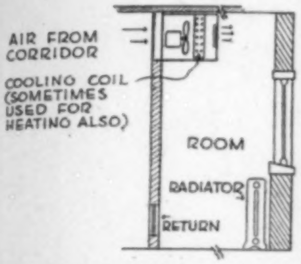




BASIS OF COMPARISON	I NON VENTILATING TYPE	II VENTILATING TYPE (LOW BLDGS)	III VENTILATING TYPE (HIGH BLDGS)
1. Principal Fields of Application	Speculative or low-priced apartments, hotels, or offices.	High-grade apartments, hotels, office buildings and hospitals, of 2 or 3 stories.	Same as II, but higher buildings.
2. Control of Temperature **a. Individual control, summer**	Yes, by control cold water.	Yes (Same as I)	Yes (Same as I)
b. Individual control, winter	Yes, by control hot water	Yes (Same as I)	Yes (Same as I)
c. Ability to simultaneously heat and cool adjacent rooms	Nil, unless a 4-pipe system is used.	Good, within limits of outdoor air, and fan performance of given unit.	Limited because of smaller primary air volume.
3. Control of Humidity **a. Summer**	No, only incidental to cooling.	Same as I.	Same as I.
b. Winter	No.	Difficult because of freezeup problems.	Same as II.
4. Service Connections **a. Wires**	Yes, usually 110 volts.	Same as I.	Same as I.
b. Pipes	3, (supply, return, drain).	Same as I.	Same as I.
c. Comparative sizes of ducts	None.	☐ Large Necessary to cut outer wall.	☐ Small Necessary to cut outer wall.
5. Relative Considerations **a. Initial cost ***	——	——	——
b. Operating cost *	——	——	——
c. All-round performance (A-Best)	D to E	C to D	C to D
d. Maintenance (A-Least)	C	C	C
e. Use of outside air for cooling in intermediate seasons	No	Yes (A)	Limited to primary air (C)
f. Small ducts or none at all (A-Best)	A	B to C	B
g. Least machinery in room (A-Least)	C to D	C to D	D (High pressure fan)
h. Degree of simultaneous heating and cooling capacity	None (E)	B to C (Good within limits of outside air) (Danger of Freezing).	Very limited (D) (Danger of Freezing).
i. Rate of odor dilution (A-Greatest)	None (E)	Good (B)	Poor (C to D)
j. Discharge grille noise level (A-Lowest)	C to D	C to D	C to D (Must have built-in sound absorber)
k. Likelihood of odor and disease germ recirculation between rooms	A	A	A
l. Least amount of rentable floor space (A-Least)	A	A	A
m. Winter humidification (A-Best)	No	Not practical because of freezeup problems.	Not practical because of freezeup problems.
n. Least cutting and patching required for installations in old buildings (A-Least)	A	B	B
o. Relative demand for engineering skill (A-Most)	D	B to C	B to C
p. System stability (Air flow)	——	Depends on fan characteristics	Stable
q. Supplementary comments	**		

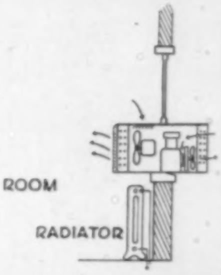
** Due to the fact that almost no installations have been made in four years and due to present confusion over wages and prices, no realistic ratings can be made at this time.*

CONDITIONING SYSTEMS FOR LARGE MULTI-ROOM BUILDINGS

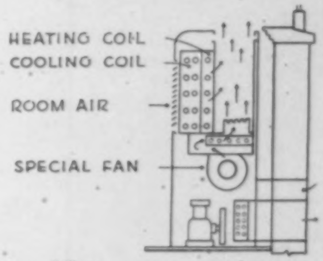


IV CORRIDOR FAN TYPE UNIT

SELF-CONTAINED TYPE UNITS



V WINDOW TYPE PORTABLE
(ALSO MADE IN UPRIGHT FLOOR MOUNTED TYPE)



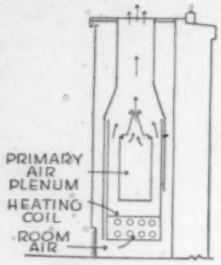
VI "SPECIAL" UNIT
FOR HIGH BLDGS

Same as III	For single offices or groups of offices, but seldom more than a few dozen offices in any one building. (Buildings not over 2 to 4 stories high)	Large office buildings, hotels, and apartments. (See Item 5q below)
Yes (Same as I)	Yes, "on-off" only.	Same as V
Yes (Same as I)	Yes, by control of separate heating system (or use of reverse cycle type unit or electric strip heater, but only in southern United States).	
Normally moderate, 100% if 4-pipe system is used.	Excellent.	Excellent.
Same as I.	Yes, but only incidental to cooling.	Same as V.
Good.	No, unless provided by separate central system. Local office freezeup and maintenance of many sprays and floats make local humidification impractical.	
Same as I.	Yes.	Yes.
Same as I.	No drain in air-cooled models. 1 supply, 1 return, and 1 drain pipe in water-cooled models.	Same as V.
Uses corridor as horizontal supply and return for ventilation and dilution only.	No ducts as such. Air openings mounted in lower half of window.	Small opening in wall as in Type III or small opening in lower half of window.
—	—	—
—	—	—
B to C	C	B
B to C	D	D
Limited (C)	A to B (But subject to wide variation between rooms due to fan characteristics on this type of unit).	Limited to primary air. (C to D)
B	A	B
C to D	D	D
B to C	AA to A if radiator heat continuously available.	AA to A if radiator heat available, or if supplementary heating coil is installed in unit.
Good (B)	B (Good, but deposits of tobacco smoke on coil tend to offset this).	Poor (C to D)
B to C	C to D	C to D
C to D	A	A
AA	A	A
A	Impractical, because of maintenance of floats, drains, etc. and likelihood of freezeups.	Same as V
C to D	A	A
A to B	C to D	C to D
Stable	Usually very seriously affected by wind and by stack effect.	Stable
**		This unit was not available prior to the war, but is shown here to indicate its relative standing if such a unit is offered postwar.

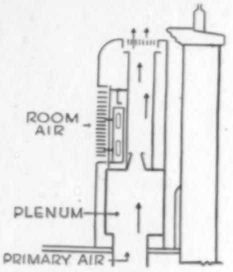
*** 4-pipe systems, under 2c above have not been tried extensively and control devices are not highly developed. First expense of 4-pipe system obviously a disadvantage.*

COMPARISON OF INDIVIDUAL ROOM AIR

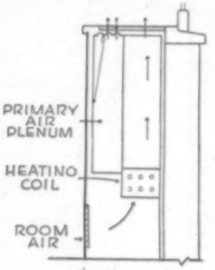
INDUCTION TYPE UNITS



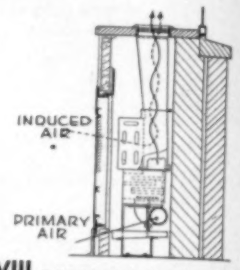
VII TYPE "A"



TYPE "B"



TYPE "C"



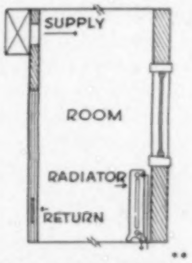
VIII "CONDUIT" OR HIGH PRESSURE TYPE

BASIS OF COMPARISON		
1. PRINCIPAL FIELDS OF APPLICATION	Office Buildings. (Both large and small) Banking Spaces Hotels	Apartment Buildings Office Buildings Hotels Hospitals
2. CONTROL OF TEMPERATURE a. Individual control, summer	Yes, by control of primary air, or warm water for reheat.	Yes, by control of water flow only.
b. Individual control, winter	Yes, by control of water or steam flow.	Same as above.
c. Ability to simultaneously heat and cool adjacent rooms	In general very good. If warm water (or steam) is available in summer, this system provides the ultimate in simultaneous heating and cooling capacity.	Yes, but cold water must be supplied in intermediate seasons.
3. CONTROL OF HUMIDITY a. Summer	Very good.	Very good.
b. Winter	Very good.	Good.
4. SERVICE CONNECTIONS a. Wires	No.	No.
b. Pipes	1 supply and 1 return.	1 supply, 1 return and 1 condensate line.
c. Comparative sizes of ducts	Supply ▭▭ Return	○ Supply
5. RELATIVE CONSIDERATIONS a. Initial cost *	——	——
b. Operating cost *	——	——
c. All-round performance (A-Best)	Generally A, but AA if summer reheat and adjustable discharge grilles.	A for hospitals, apartments, and hotels. B for office buildings.
d. Maintenance (A-Least)	A	B (because of nozzle and coil cleaning)
e. Use of outside air for cooling in intermediate seasons	A	C or D
f. Small ducts or none at all (A-Best)	C	A
g. Least machinery in room (A-Least)	A	A
h. Degree of simultaneous heating and cooling capacity	With hot water (or steam) and cold air, this system provides the ultimate in simultaneous heating and cooling capacity.	Usually satisfactory, but temperature reduction at night for sleeping room applications is limited.
i. Rate of odor dilution (A-Greatest)	A	C to D
j. Discharge grille noise level (A-Lowest)	B	A
k. Likelihood of odor and disease germ recirculation between rooms	Same as any conventional "central station" system (C to D)	Almost eliminated as far as air conditioning is concerned. (A to B)
l. Least amount of rentable floor space (A-Least)	C	B
m. Winter humidification (A-Best)	A	A to B
n. Least cutting and patching required for installations in old buildings (A-Least)	D	B to C
o. Relative demand for engineering skill (A-Most)	A to B	A to B
p. System stability (Air flow)	Stable without volume control. This system is much less desirable when volume control is used.	Stable.
q. Supplementary comments		

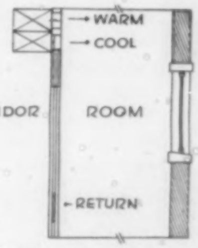
** Due to the fact that almost no installations have been made in four years and due to present confusion over wages and prices, no realistic ratings ca be made at this time.*

CONDITIONING SYSTEMS FOR LARGE MULTI-ROOM BUILDINGS

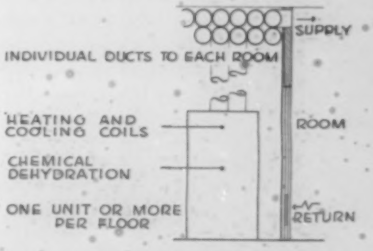
CENTRAL DUCT SYSTEMS


SUPPLY
ROOM
RADIATOR
RETURN
**

IX CORRIDOR DUCT AND RADIATOR


WARM
COOL
CORRIDOR
ROOM
RETURN

X DUAL DUCT SYSTEM


SUPPLY
INDIVIDUAL DUCTS TO EACH ROOM
HEATING AND COOLING COILS
CHEMICAL DEHYDRATION
ONE UNIT OR MORE PER FLOOR
ROOM
RETURN

XI PRE-CONDITIONED PRIMARY AIR WITH INDIVIDUAL SUPPLY DUCTS

IX CORRIDOR DUCT AND RADIATOR	X DUAL DUCT SYSTEM	XI PRE-CONDITIONED PRIMARY AIR WITH INDIVIDUAL SUPPLY DUCTS
Used largely as an addition to existing office buildings, hotels, and apartments.	**Large office buildings.**	**High-grade hotels and apartments.**
Yes, by air volume.	Yes, but by air volume which results in need for delicate static pressure control equipment.	Yes
Yes, by radiator control.	Yes, by radiator control or by volume control of "warm" duct.	Yes
Good, provided radiator heat always available.	Very good.	Very good.
Yes **	Yes	Yes, exceptionally good. (Uses chemical dehydration)
Yes **	Yes	Yes
No, unless for automatic controls in each room.	Same as IX.	Same as IX.
Radiator supply and return plus control tubing.	Control tubing.	Control tubing, (occasionally radiators)
		Individual 6- and 8-inch supply ducts to each room.
—	—	—
—	—	—
B to C	A for office buildings. B to C for hospitals, hotels, apts.	A
A	A to B	A to B
A	A	A
C to D	D	C to D
A	A	A
A if radiator heat available. (D if not)	A	A
A	A	A
A to B	A to B	A to B
Maximum of Recirculation. (C to D)	D	B to C
C to D	C to D	B to C
A	A	A
B to D	C to D	C to D
A	A	A
Unstable unless supplied with delicate control equipment.	Inherently unstable.	Stable.
When used with constant volume and individual reheaters, this makes an excellent system.		

*** This system must be zoned to get given results—with zoning either by fans or local zone heaters.*

(*Continued from page 111*)

Performance expectations. The man who purchases a portable room cooler for his office, for instance, or even the store owner who selects air conditioning equipment for a dress shop, does not expect as much from the equipment as do the office worker and hotel guest. For one thing, the individual or store owner who purchases the equipment is making his *own* selection, and obviously has spent a lot of time in deciding which is the best equipment to buy. Strange as it may seem, he will put up with a lot more in the way of unsatisfactory performance than will a hotel guest, or the occupants of large office buildings, large apartment houses, or hospitals. Justifiable or not, this situation results in the establishment of higher performance expectations for multi-room air conditioning than for almost any other type.

Type and extent of controls. In a building that has an occasional office equipped with room coolers, it is generally found that some one person more or less accepts the responsibility of turning the switches on and off, and of adjusting the knobs to maintain a satisfactory temperature level throughout the day. However, when air conditioning is installed throughout a large office building, it is no longer possible to rely upon the occupants for doing any appreciable manipulating of controls. Even in the case of a large building heated with radiators and an old-style steam system, occupants for some strange reason will open a window when the temperature gets too high rather than turn off the radiator valve. Let the building management install air conditioning, and this psychological quirk, if it can be called that, is magnified many times, and the occupants expect completely automatic temperature control during every minute of the working day.

Variation in standards. In a large office building, hotel, or apartment building, there are hundreds and possibly even thousands of occupants, who vary widely as to age, state of health, and amount of clothing that they wear. All of these factors result in many different ideas of what constitutes "comfort." The old fellow in one office may have been out late last night and lowered his metabolism rate, with the result that what is "comfortable" for him is not at all so for the young sales manager next door. The secretary in the next office may have still another idea as to what is a satisfactory standard of comfort. Consequently, this matter of "variation of standards" is not something to be passed over lightly.

Volume of complaints. Even disregarding the proportionately greater number of occupants in the larger buildings, the factors mentioned make it obvious that the building management will receive a proportionately greater volume of complaints than will occur with most other types of air conditioning installations. The system must be flexible indeed which has any chance of keeping this volume to a practical low level.

Outside space versus central space. Once Btu load sheets are made up for the individual offices, hotel rooms, and apartment rooms, the engineer may in many cases realize that outside factors of sun load and wall transmission represent a greater proportion of the total load than in the more conventional type of air conditioning installation. The greater the use of glass, the more severe this problem becomes, with the result that the air conditioning system must be much more flexible in its capacity control than systems installed in department stores, dress shops, and industrial plants. The trend toward heavier illumination partially offsets this situation, but failure to examine this phase of the design problem carefully may result in the selection of a system which causes a never-ending series of complaints.

Taking all of these factors into consideration, the writer believes that they point up a need for heating and cooling flexibility that is all too frequently overlooked by the designers of multi-room air conditioning installations. For that reason Items 2c (ability to heat and cool adjacent rooms simultaneously), 5e (use of outside air for cooling in intermediate seasons), and 5h (degree of simultaneous heating and cooling capacity), on the comparison chart, represent points which should receive extremely serious consideration — certainly far more serious consideration than they have been given in the past.

AIR DISTRIBUTION

In general, many of the types of systems shown on the comparison charts will give highly satisfactory air distribution within the conditioned space. The hotel or office building which uses a corridor-duct system with radiators under the windows is generally as satisfactory, from the air distribution standpoint, as an induction unit placed under the window. However, in the newer buildings with the trend to lighter wall construction and larger glass areas, a greater portion of the heating and cooling load is concentrated on the periphery of the building. The placing of induction units or fan units along the outside wall assures a more rapid heat exchange between the conditioning air and the room air, with the result that there is still less likelihood of draft complaints.

MAINTENANCE

It is obvious that the amount of maintenance required is a most important factor in the selection of equipment. In general, this point argues against the installation of hundreds of self-contained air conditioning cabinets, each of which has its own motors, compressors, fans, filters, and drains that are potential maintenance hazards.

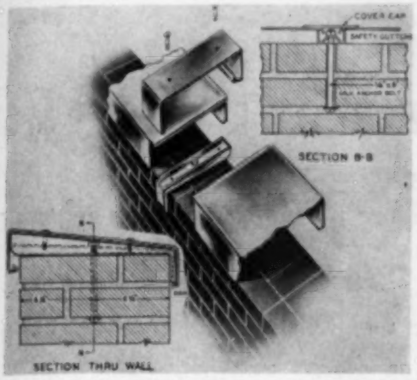
The problem is not quite so severe with fan type units, and provided the corridor fan type unit is supplied with a quiet and long-lived fan motor, maintenance for such equipment should not be unreasonable. In general, low maintenance favors some type of control duct system such as systems IV, VII, VIII, IX, X and XI.

Generally a dry finned coil picks up less lint and dirt within an office or hotel room than does a wet coil of the identical design. Therefore, in the case of induction units or corridor type fan units (systems using a finned coil in each room), the cleaning problem will be minimized if the primary air is passed through either mechanical dehumidification or chemical dehydration equipment.

While the prime objective of this investigation was the preparation of analysis charts for use in visual comparison and analysis of different types of multi-room air conditioning systems, certain general conclusions may be drawn:

1. The problem of satisfying the user is more difficult in a multi-room air conditioning installation than it is in most other types of installations. Factors are present which call for far greater flexibility as to temperature control, with the result that sizable heating and cooling loads must at many times of the year be cared for simultaneously.
2. In general, the problem of maintenance is such that, for most very large buildings, serious consideration can be given only to some type of central duct system with a minimum of mechanical equipment in the occupied spaces.
3. The complications are so numerous and the monetary value of the equipment so great that any engineer, architect, or installing contractor who has not previously installed air conditioning in a large multi-room building should undertake an assignment in this field only after having given the problem very detailed study.
4. Since literally thousands of people will be exposed to the air conditioning in just one large hotel or office building installation, special effort should be made to assure a high standard of performance in such installations.

PRODUCTS for Better Building



Coping has gutter bar to drain off seepage

METAL COPING

New on the building market is the *Goodwin Lifetime Metal Coping*, which will be produced in a series of standard sizes and edgings to fit most coping jobs. At present production is concentrated on 12½ in. and 8½ in. widths for standard walls. Installation begins with anchor bolts which are set in the mortar or in drilled holes. A formed metal channel fastens to the anchor bolt and longitudinal sheets with crimped edges hook over this gutter bar, forming a tight joint. Over this joint slides the safety cover, held in place by two screws. This construction is said to form a tight joint with room for expansion and contraction; and to provide for disposal of any water seepage by means of the extruded metal gutter bar. The coping is being made in aluminum, copper, Monel, and stainless steel. Overly Mfg. Co., Greensburg, Penn.

FLASHING

New and improved *Thru-Wall Flashing* is designed to prevent leaks and seepage in building walls and so combat disfiguring streaks, stains, and efflorescence, and the rusting of spandrel beams. The following features are offered as outstanding improvements: saw-tooth corrugations that form a mechanical key bond in the mortar; rapid drainage if moisture should penetrate; provision for expansion and contraction; interlocking overlap which requires no soldering; stiff counterflashing face that hugs the wall tightly; and the ease with which it can be worked. This copper flashing is available in sheet form in 6 ft. lengths and standard widths up to and including 34 in. Chase Brass & Copper Co., Waterbury, Conn.

ALUMINUM WIRING

To ease the wire shortage resulting from the temporary scarcity of copper, United States Rubber Co. has announced that it will substitute aluminum for copper in some of its building wire and cable now going into production. The insulated aluminum wiring will be made in all sizes, as approved by Underwriters' Laboratories. According to the announcement, lightweight aluminum has high electrical conductivity and adequate flexibility; and has been developed through research into wire with same overall diameter as equivalent copper sizes. United States Rubber Co., Rockefeller Center, New York, N. Y.

LOCKS

A newly engineered line of lock hardware for doors, *Integralock*, is said to have 30 per cent fewer moving parts. With the exception of the knob casting, all moving parts are of high-strength, pressure-formed metals — extruded brass, cold formed steel, and bronze forgings. Integralock will be available in the mortise type and cut-out type, both with cylinder in knob, in a number of bronze, brass, and chromium finishes. Sargent & Co., New Haven 9, Conn.

HOLLOW WALL SYSTEM

Recently announced is the *Gold Bond Hollow Wall System* which employs two free-standing partitions that are completely independent of each other, without ties or bridging. The result is an interior wall that can readily enclose house plumbing, wiring, and ducts, and which is reported to have unusually high sound-insulation qualities for combating room-to-room noise. These fireproof partitions, erected a specified distance apart to form a single wall, consist of plaster applied to metal lath hung on channel studs, which are fastened to ceiling runners and metal base. Tests indicate that a double wall built in this manner, 4 in. thick, is more effective in reducing noise transmission than an 8-in. hollow tile wall, plastered on both sides. National Gypsum Co., Buffalo 2, N. Y.

AIR FILTER

Easily removed for cleaning and servicing, *Agitair FM Air Filter* is of all-metal construction and consists of layers of metal that induce turbulent cyclonic action of air within the filter. It is designed for efficient performance at an approach velocity of 432 fpm, handling 1200 cfm through a 20 in. by 20 in. filter panel. Frame is of welded cold-rolled steel. Air Devices, Inc., 17 East 42nd St., New York 17, N. Y.

FIRE-FIGHTING AIDS

Two new items have recently been announced in the fire-fighting field. *All Weather* fire hose, pure white in color, is treated for water- and mildew-resistance, and double-jacketed to withstand the abrasive effect of dragging over rough surfaces. Special high-tension cable cord gives reinforcement where most needed. Flexibility is not sacrificed, however, since the hose is said to be of fine quality for easy handling and snug racking. Announced also is the *Foamite Air-form Generating Nozzle*, only 2½ in. in diameter at the widest part of the barrel, which mechanically creates Airfoam through a scientific mixing of water, air, and Foamite Airform Liquid within the nozzle. It is especially recommended for extinguishing fires in flammable oils, paints, and varnishes. The nozzle reportedly can be converted instantly to straight water operation simply by removing the pick-up tube from the Foamite. American-LaFrance-Foamite Corp., Elmira, N. Y.

WALL-VENTED HEATER

Completely self-contained, the *Saf-Aire Heater* operates on natural, manufactured, or liquefied petroleum gas, and features the *Lundstrum Safety Vent*, located just outside the heater on the exterior of the building wall to introduce air and expel gaseous fumes. The heater is installed between the studs of an outside wall, and has a sealed combustion chamber of cast aluminum. Exhaustive tests are said to demonstrate that it is explosion-proof and fireproof, and that operating costs are as much as 20 per cent below that of conventional vented heating systems. An obvious advantage over non-vented systems is the absence of health hazards, and, over other vented types, the elimination of room pipes, flues, or unsightly ducts. The heater is manufactured in two sizes (10,000 and 20,000 Btu), and is available with a thermostat for automatic control. Heating Research Corporation, Muncie, Ind.

Safety vent on exterior wall provides air intake and vent for compact gas heater

(*Continued on page 128*)

COMPARATIVE ECONOMY OF FIREPROOF FLOOR SYSTEMS

By Theodore Barbato, Consulting Engineer

An analysis of floor systems, which are compared as to weight, structural characteristics, relative cost, and availability of materials, for different spans and load conditions

During the writer's experience of over 25 years in fireproof floor construction, he has been amazed at the large percentage of projects in which an uneconomical type of floor construction and framing was shown and specified. Too often it has happened that after a complete set of plans has left the architect's and engineer's drafting room, it has been discovered that the choice of a different floor construction would have answered the purpose better in terms of (1) suitability of design to purpose, (2) economy of cost of materials and labor, and (3) economy in time of construction.

Presented herein are a few salient points regarding procedure to follow in arriving at an economical choice of fireproof floor construction and type of framing, for such buildings as hospitals, hotels, schools, apartment houses, and office buildings, where the specified live loads are relatively light and well distributed. Sketch plans and sections for a typical bay of various types of fireproof floor construction most commonly used in the United States are shown on the following pages, with a brief outline of their comparative relative economy, assuming normal availability of materials.

With the present increased cost of materials and labor, the difference between the comparative cost of various types of floor construction has also increased. Therefore, it becomes even more necessary to make the proper choice of an economical construction at the outset, before detailed work in the drafting room gets under way, thereby saving the owner the cost of any redesigning.

Before deciding upon the type of floor construction, it is necessary, of course, to be familiar with (1) local labor conditions, wages, and efficiency, and (2) the availability of local materials. Today's high cost of transportation makes it advisable and economical to make use of locally manufactured materials. It sometimes happens that a project in the vicinity of a hollow tile plant, for example, is designed for metal forms or other type of construction requiring the transportation of materials from a distant point, when a slab employing ordinary partition tile might ultimately have proved more economical and speedier to construct.

SELECTING THE FRAMING SYSTEM

The greatest economy can only be obtained if the owner realizes how much to his advantage is time and money spent in thorough and competent engineering analysis and design.

The writer would caution against too ready reliance upon a single structural framing system as the final answer to economical building construction. Both structural steel and reinforced concrete are excellent materials, and the comparative economy of each may become obvious only by a study of the particular project, analyzing such factors as size of building, soil conditions, number of stories, desired column spacing, availability of materials, labor conditions and costs, transportation costs, and available storage space on the job site.

Reinforced concrete framing is usually most economical in structures with very heavy live loads. For the types of buildings previously mentioned, reinforced concrete framing generally is found to have some slight economy only in structures of moderate height (4 or 5 stories). For higher buildings, greater economy and speedier installation is usually obtained through use of structural steel framing. Lately some housing structures up to 15 stories in height have been designed and constructed of reinforced concrete framing, but this has been due mainly to the existing delay in obtaining deliveries of structural steel rather than to any pronounced inherent economy in this type of construction.

ECONOMY OF FILLER BLOCKS

In all long-span floor constructions, both one-way and two-way, where filler tiles are used, the difference in cost between the filler blocks on forms and the equivalent displaced volume of concrete partly determines the comparative cost of these types of floor slabs. The unit weight of the filler blocks will affect, to some extent, the load on supporting members. Therefore, the difference in cost of framing and foundations should also be considered when comparing the costs of various long span filler tile systems.

BASIS OF COMPARISON

A few points affecting relative economy are summarized for each of the various types of fireproof floor construction illustrated on the following pages. Systems under consideration are suitable for floors subjected to light live loads, and spacing of columns ranging from 16 to 24 ft., inclusive, which is considered a normal range for the types of buildings in question. Most of these floor systems can be used with either structural steel or reinforced concrete framing members, and all comparisons include a plastered ceiling. Also listed are average deadweights for each of the various types of floor construction.

These relative comparisons are based on the prevailing labor rates and material costs in New York City and surrounding areas. Some variation of these costs will be found in other sections of the United States because of the difference in labor rates and material costs, and due allowance should be made for such deviations.

In the following summary of the various floor types, each floor slab that can be used in conjunction with both structural steel framing and reinforced concrete framing is identified with the letters S and C, respectively.

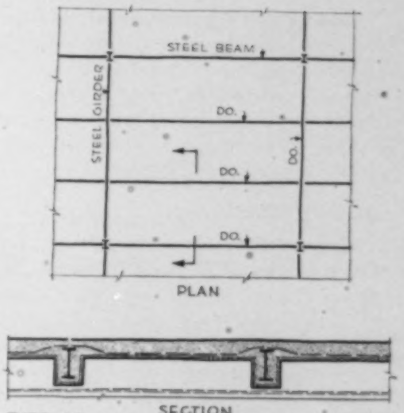
AN ANALYSIS OF FIREPROOF FLOOR SYSTEMS

All types of fireproof floor construction under consideration comply with requirements of the New York City Building Laws for Class 1, Fireproof Structures. Systems are suitable for floors subject to relatively light live loads, on column spacing ranging from 16 to 24 ft. (common to hospitals, hotels, schools, apartment houses and office buildings). Due to changing cost factors, only relative costs can be given.

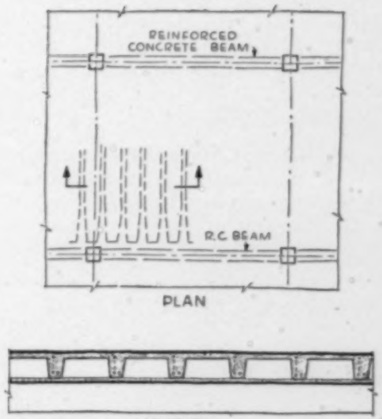
WEIGHT OF FLOOR CONSTRUCTION

Type 1S	69 lb. per sq. ft.	Type 6C—6S	80 lb. per sq. ft.
Type 2C—2S	77 lb. per sq. ft.	Type 7C—7S	86 lb. per sq. ft.
Type 3C—3S	83 lb. per sq ft.	Type 8C—8S	82 lb. per sq. ft.
Type 4C—4S	90 lb. per sq. ft.	Type 9	95 lb. per sq. ft.
Type 5C—5S	70 lb. per sq. ft.	Type 10S	60 lb. per sq. ft.

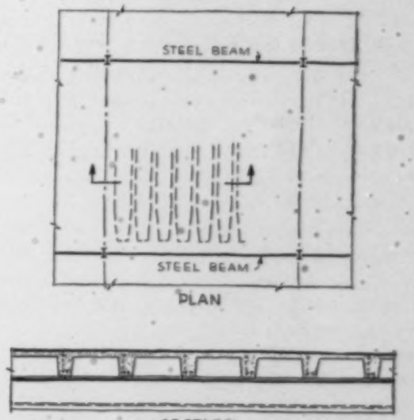
(These are average weights for spans varying from 16 to 24 ft., and include weight of all floor construction and ceiling but not finish floor or subflooring. Where systems are suitable for either steel or reinforced concrete framing, average weight is given since the difference in weight of steel and reinforced concrete supporting beams is not a significant factor.)



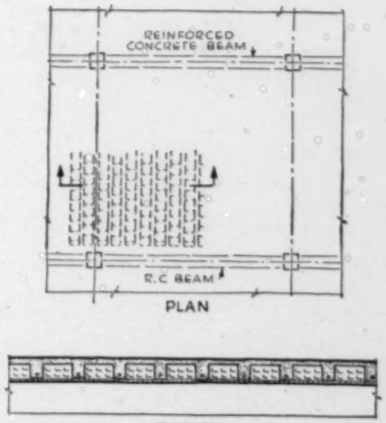
TYPE 1S
CINDER CONCRETE ARCH, WELDED WIRE FABRIC REINFORCEMENT & STRUCTURAL STEEL FRAMING



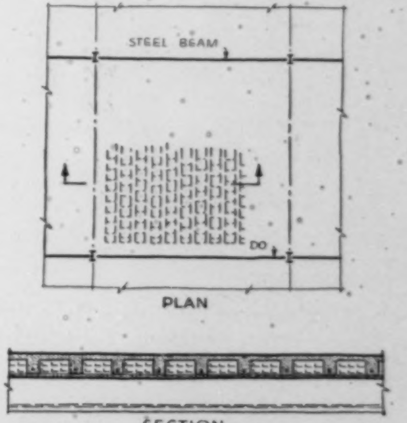
TYPE 2C
REMOVABLE METAL FORMS (ONE-WAY) REINFORCED CONCRETE FRAMING



TYPE 2S
REMOVABLE METAL FORMS (ONE-WAY) STRUCTURAL STEEL FRAMING



TYPE 3C
ONE-WAY RIBBED SLABS, HOLLOW TILE FILLERS, REINFORCED CONCRETE FRAMING



TYPE 3S
ONE-WAY RIBBED SLABS, HOLLOW TILE FILLERS, STRUCTURAL STEEL FRAMING

Type 1S. Cinder Concrete Arch, Welded Wire Reinforcement:* Most generally used construction in N.Y.C. and metropolitan area, and most economical wherever good quality of cinders is obtainable. This is an excellent fireproofing material and offers good surface for plastering directly on the arch and steel fireproofing. Economical regardless of height of building, floor area, or irregular spacing of columns. Speeds construction since all formwork is suspended from steel floor beams and girders, freeing lower floors of temporary uprights and shoring. Deadweight is lightest with exception of Type 10, permitting economical framing and foundation design. Where cinders of good quality are unavailable, an inexpensive lightweight aggregate can be used.

Type 2C and 2S. One-Way Removable Metal Forms:* Ranks next to Type 1 in economy, and has advantage over many other long span slabs in that open formwork can be used, permitting extensive reuse of temporary planks which support metal forms and construction load at bottom of ribs. Also, there is less weight of material to be handled on the job. Deadweight is not a great deal over that of Type 1. Increased cost becomes proportionally smaller as span or distance between supporting girders increases. Hence, system is very suitable for longer spans. Metal lath is required in order to obtain a smooth plastered ceiling.

Type 3C and 3S. One-Way Ribbed Slabs Using Hollow Tile Fillers:* Only slightly more expensive than Type 2. However, if project is located near hollow tile plant it may be more economical than both Types 1 and 2, as filler blocks considered in this comparison are ordinary partition blocks, not special floor blocks. This slab, with an all-scored tile ceiling offers excellent base for plastering.

(*Continued on page 123*)

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*C=Reinforced Concrete Framing; S=Structural Steel Framing

MANUFACTURERS' LITERATURE

ACOUSTICS

Gold Bond Acoustimetal. Specifications and construction details on a perforated metal acoustical system. Complete specifications and a section of detailed architectural drawings and technical erection data. 8 pp., illus. National Gypsum Co., Buffalo 2, N. Y.*

ADOBE BRICKS

Cemadobe: How to Make Your Own Bricks of Earth and Build Your Own House. Description of a system of making building bricks of Portland cement and natural soil or adobe. Advantages claimed for this construction, equipment needed to make the brick, general information on house planning, sample floorplans, construction details. 32 pp., illus. Cem-Adobe Co., Dept. AR, Box 81, West Los Angeles Station, Los Angeles 25, Calif. $1.00.

BUILDING STONE

(1) The Nation's Building Stone and **(2) Indiana Limestone: The Nation's Building Stone.** The first of these is a 16 mm. sound film, available without charge to A.I.A. chapters and other interested groups, telling the story of limestone from quarry through mill to finished building. The second is an illustrated booklet (20 pp.) on the same subject; shows quarries, mills, carving procedures, typical buildings and details; describes the stone, gives its characteristics. Indiana Limestone Institute, Bedford, Ind.

COLOR USAGE

Du Pont Color Conditioning for Industry. The use of color to increase production, improve seeing conditions and create a better working environment; fundamental principles of color conditioning. Outlines Safety Color Code for Industry, illustrates a coordinated functional color program for an entire plant. 32 pp., illus. Finishes Division, Dept. M-6, E. I. Du Pont de Nemours and Co. (Inc.), Wilmington 98, Del.*

COMPRESSORS

Worthington HB Single Horizontal Compressors (Bulletin L-640-B1A). Specifications, installation details, accessories, dimensions, general data table. 24 pp., illus. Worthington Pump and Machinery Corp., Harrison, N. J.*

ELEVATORS

(1) Otis Hoistway Door Closer and Electric Interlock, Type 4-B, and **(2) Elevator Car Design 155.** The first of these bulletins describes operation, safety devices, advantages claimed for an electric elevator door closer. Second bulletin illustrates and describes a new car design. 4 pp. ea., illus. Otis Elevator Co., 260 11th Ave., New York City.*

FUEL COST REDUCTION

How to Cut Oil Costs with Robot-Eye Electronic Combustion Control. Bulletin describing a system of combustion control said to show a 15 to 20 per cent reduction in fuel consumption; explanation of the principle of haze control. 4 pp., illus. General Power Plant Corp., 381 Fourth Ave., New York 16, N. Y.

METAL FRAMING

Unistrut. Bulletin describing a method of metal frame construction requiring no drilling and no welding: gives specifications, shows typical installations. 4 pp., illus. Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill.

METERS, SWITCHES

(1) New FA Main and Range Service Equipment, and **(2) FA Type AC Circuit Breaker.** Bulletins describing meter, switch and fuse boxes and circuit breaker panel boards; complete specifications included. 4 and 8 pp., illus. Frank Adam Electric Co., St. Louis, Mo.*

MOTORS

The A-B-C of Synchronous Motor Control. Booklet telling the story of "conscious" synchronous motor starts, how polarized field-frequency control works, etc. Includes connection diagram, selection chart for control, description of units available, suggestions for the operator. 20 pp., illus. Electric Machinery Mfg. Co., Minneapolis 13, Minn.

MYCALEX

G-E Mycalex. Gives properties, available types, molded parts, fabricated parts, machining practice, ordering information for Mycalex, stone-like product composed of mica and special glass. Includes properties chart of six grades of Mycalex of both compression and injection molded types. 24 pp., illus. Chemical Dept., General Electric Co., Pittsfield, Mass.*

PLASTIC MIXER

For Better Mixes: Rex Mortar and Plaster Mixer (Bulletin 46–11). Descriptive folder illustrating the features of the mixer, giving a table of specifications. 6 pp., illus. Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.

ROOFING

Choose Your Roof for Rain and Shine. Booklet on asphalt roofing with special emphasis on exterior color design in architecture. Includes tips on home planning and remodeling and the use of color on house exteriors, plus basic information on roofing application. 42 pp., illus. Asphalt Roofing Industry Bureau, 2 W. 45th St., New York 19.

SOUND SYSTEMS

School Sound Systems. Prepared by the Joint Committee on Standards for School Audio Equipment. A guide for the equipment of schools either old or new with audio educational devices. Gives charts of typical school day audio activity programs, diagrams of suggested functional installation for built-in school audio facilities. Discusses installation considerations for the various sections of a school — studios and control room, classrooms, auditorium, etc. 32 pp., illus. Radio Mfgrs. Assn., 1317 F St., N.W., Washington, D. C.

UNDERGROUND PIPE

Therm-O-Tile, The Permanent Conduit for Underground Pipe Lines. Description of Therm-O-Tile, advantages claimed, specifications, installation details, waterproofing procedure. 4 pp., illus. H. W. Porter & Co., Inc., 818-S Frelinghuysen Ave., Newark 5, N. J.*

WALLS

Brick and Tile Cavity Walls. Complete information on cavity wall construction: advantages offered, properties, construction details, cost data. Construction details include installation of windows and doors, electrical conduits, and termite shields. 12 pp., illus. Structural Clay Products Institute, 1756 K St., N.W., Washington 6, D. C.*

WATER PURIFIER

Filt-R-Stil Delivers Drinking Water from Brackish Water. Pamphlet describing potable water units and their use. Includes operating data, specifications of standard models, the mechanical and chemical theories involved. 8 pp., illus. American Cyanamid Co., Ion Exchange Products Dept., 30 Rockefeller Plaza, New York 20, N. Y.

WATERPROOF CONNECTORS

Cannon Electric Type "W" Waterproof Connectors (Bulletin W-146). General information on a line of waterproof connectors designed specifically for sub-marine geophysical exploration but adaptable for use in swamps, lakes, rivers, docks, with underground cable, etc. Includes diagrams, dimensions tables, specifications. 4 pp., illus. Cannon Electric Development Co., Dept. AR, 3209 Humboldt St., Los Angeles 31.*

(Continued on page 144)

** Other product information in Sweet's File, 1946.*

It's what's *Inside* that Counts!

WHAT makes a piano a master-work the eye seldom sees. But the *inside* quality shows up in tone, in performance, in *enduring* service.

With building products, too, it's what's *inside* that counts. Hidden, inside values you can't judge on appearance alone.

That's why building-wise people *insist* on Celotex Building and Insulating Products. They know that the raw materials that go into Celotex products are the finest that nature can grow and man can refine.

They know, too, that rigid production controls all along the line *guarantee* the uniformly high quality of every product bearing the Celotex name.

Tireless laboratory research perfects materials and methods still *more*... helps to maintain Celotex leadership year after year.

These, plus more than a quarter of a century of building materials "know how," are the invaluable ingredients in every Celotex product.

They make a big difference in performance... in long life and low cost maintenance. A difference that has proved its value on hundreds of thousands of building jobs of every kind.

•

There aren't enough of these famous Celotex products to go around *now*—but our plants throughout the country are working day and night to increase production. Everything possible is being done to speed the time when we can supply you with all the Celotex products you need.

Building Board
Interior Finish Boards
Celo-Siding
Rock Wool Insulation
Celo-Rok Sheathing and Wallboard
Celo-Rok Anchor Lath and Plaster
Cemesto
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LABELS of LEADERSHIP

SYMBOLS THAT MEAN A SUPERIOR STEEL BOILER

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FITZGIBBONS BOILER CO., INC. NEW YORK, N.
FITZGIBBONS BOILER CO., INC. OSWEGO

The FITZGIBBONS "D" TYPE STEEL BOILER

This is the boiler to heat an apartment or office building — theatre — hospital — school — the City Hall. It has the *right* form and area of combustion chamber to provide most complete combustion of any fuel — the *right* tube arrangement to promote maximum water circulation — the *right* design to make operation markedly convenient. Built in types for oil, gas, stoker and hand firing, and sizes to 42,500 sq. ft. steam. "D" Type Catalog, recently published, on request.

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS' CODE establishes the minimum requirements for the construction of steel boilers. Only manufacturers whose products comply with these standards are authorized to use the A.S.M.E. Code symbol. You will find it on all Fitzgibbons Steel Boilers.

THE HARTFORD STEAM BOILER INSPECTION AND INSURANCE CO. Its mark under the Code symbol is evidence that the "Hartford" has inspected the boiler to see that it complies with A.S.M.E. Code requirements. All Fitzgibbons Steel Boilers are "Hartford-inspected" and bear the "Hartford" mark.

THE STEEL BOILER INSTITUTE. This is an organization whose sole purpose is to rigidly maintain steel boiler standards and rating qualifications. A boiler with this mark may be selected with certainty that it complies with the S.B.I. Rating Code. Fitzgibbons "D" Type boilers have this mark.

ONE MORE SYMBOL that indicates a superior boiler is the Fitzgibbons trade mark. It has earned the established prestige of sixty-one years of dependable steel boiler building and is placed only on boilers which have passed the rigid tests of Fitzgibbons inspectors. Many thousands of boilers now in service attest to the high standard which this mark implies.

SEE THE FITZGIBBONS EXHIBIT
Space 258 — Heating and Ventilating Exposition
Cleveland, January 27-31

Fitzgibbons Boiler Company, Inc.
General Offices: 101 PARK AVENUE, NEW YORK 17, N. Y.
Manufactured at: OSWEGO, N. Y.
SALES BRANCHES IN PRINCIPAL CITIES

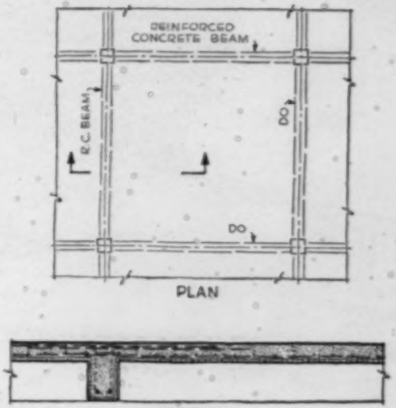
FITZGIBBONS

MOST ECONOMICAL IN FUEL
1886
THE FITZGIBBONS BOILER

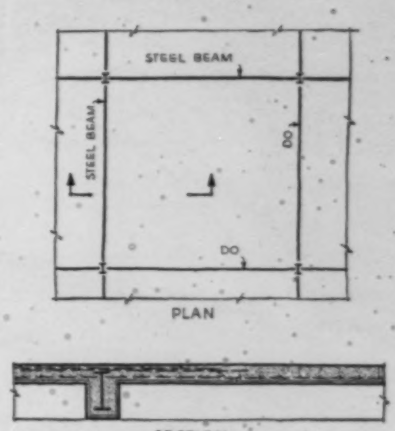
AN ANALYSIS OF FIREPROOF FLOOR SYSTEMS

(Continued from page 119)

Type 4C and 4S. Two-Way Solid Concrete Slabs:* Cost is about equal to that of Type 3. Deadweight is heavier than that of previously considered systems. This construction merits serious consideration, however, if panels between supporting beams are square or nearly so and site has high bearing capacity. Cost of construction can be lowered somewhat in buildings where plastering can be omitted and joints between form panels pointed.

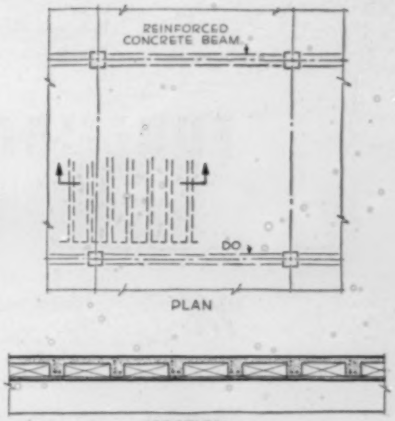


TYPE 4C
TWO-WAY SOLID CONCRETE SLABS
REINFORCED CONCRETE FRAMING

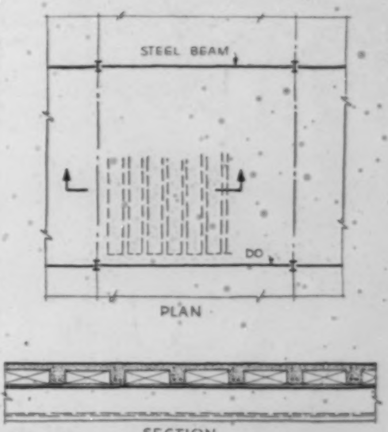


TYPE 4S
TWO-WAY SOLID CONCRETE SLABS
STRUCTURAL STEEL FRAMING

Type 5C and 5S. One-Way Ribbed Slabs Using Lightweight Wood Fibrous Cement Block Fillers:* Similar to Type 3 except that lightweight wood fibrous cement filler blocks are substituted for hollow tile partition blocks. This system is somewhat lighter than Type 3. It offers good bonding surface for plastering and has excellent insulating and acoustical properties. Unit cost per sq. ft. is somewhat higher than Type 3, and increases materially as span or distance between supporting beams or girders is increased.



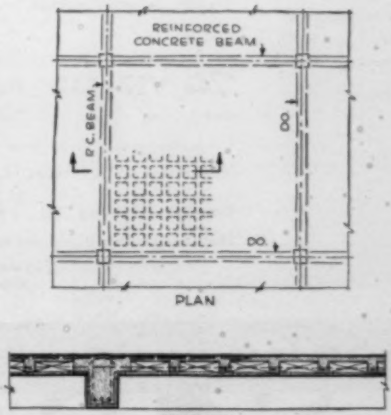
TYPE 5C
RIBBED SLABS (ONE-WAY) LIGHTWEIGHT WOOD
FIBROUS CEM. BLOCK FILLERS. REINF. CONC. FRAMG



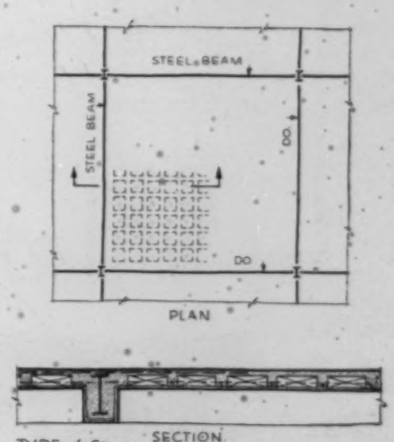
TYPE 5S
RIBBED SLABS (ONE-WAY) LIGHTWEIGHT WOOD
FIBROUS CEM. BLOCK FILLERS, STRUCT. STEEL FRAMG

Type 6C and 6S. Two-Way Block Systems:* Consists generally of a combination of concrete and filler blocks of either hollow tile, lightweight aggregate concrete, cinder concrete, gypsum, or lightweight wood fibrous cement blocks. Hollow tile and concrete blocks aid strength of the slab. Cost of these systems is higher than previous types mentioned because difference in cost between filler blocks on forms and equivalent volume of concrete determines their comparative increased cost over two-way solid concrete construction.

Most economical two-way block floor construction usually is obtained by using hollow tile filler blocks composed of ordinary partition blocks, obtainable in most localities.



TYPE 6C
TWO-WAY BLOCK SYSTEMS
REINFORCED CONCRETE FRAMING



TYPE 6S
TWO-WAY BLOCK SYSTEMS
STRUCTURAL STEEL FRAMING

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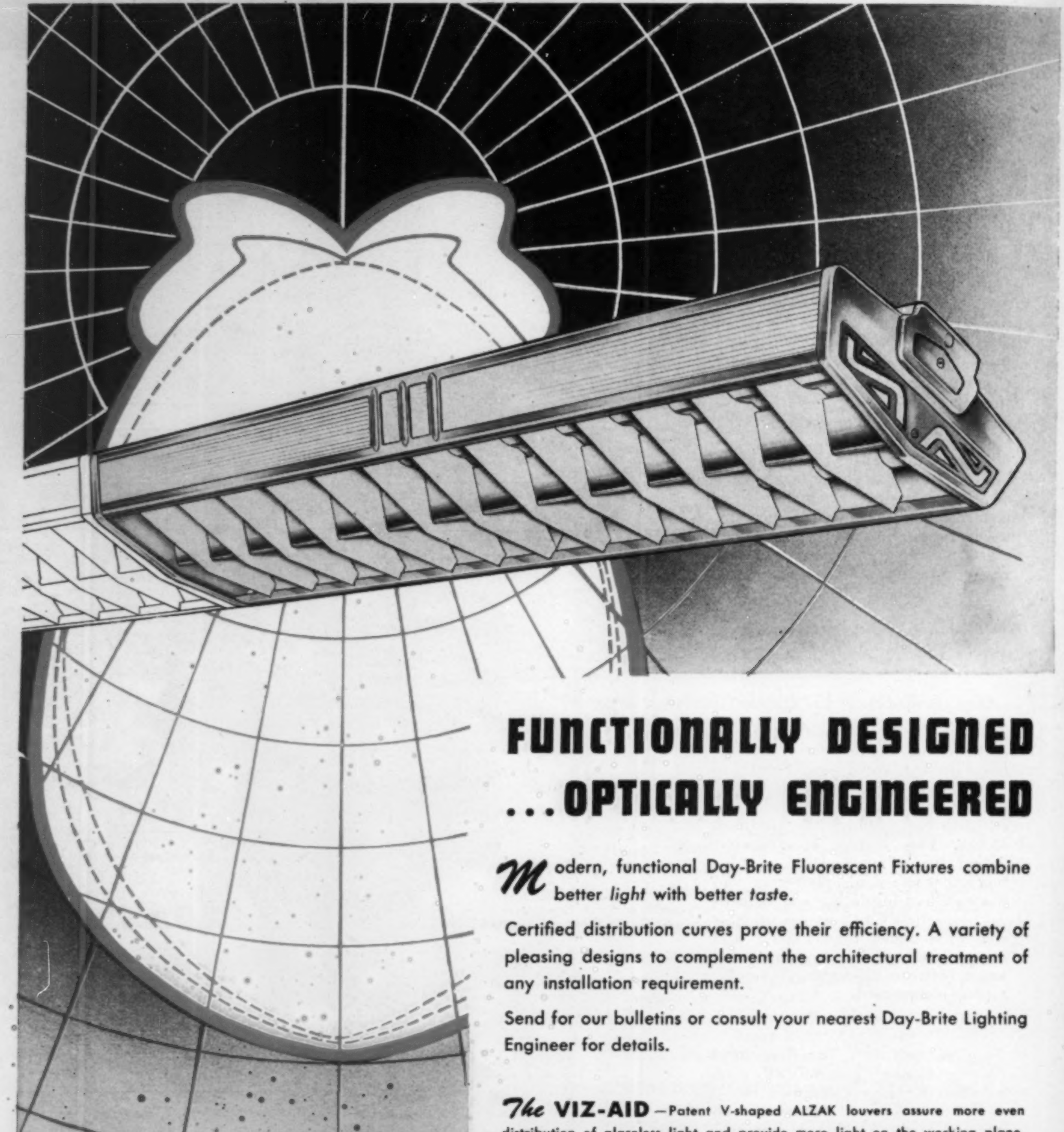
*C = Reinforced Concrete Framing; S = Structural Steel Framing



FUNCTIONALLY DESIGNED ...OPTICALLY ENGINEERED

Modern, functional Day-Brite Fluorescent Fixtures combine better *light* with better *taste*.

Certified distribution curves prove their efficiency. A variety of pleasing designs to complement the architectural treatment of any installation requirement.

Send for our bulletins or consult your nearest Day-Brite Lighting Engineer for details.

***The* VIZ-AID** — Patent V-shaped ALZAK louvers assure more even distribution of glareless light and provide more light on the working plane. For continuous or unit mounting — surface or suspension. Designed for two 40-watt lamps. U. S. Patent No. D-138990 — others pending.

Day-Brite Lighting, Inc., 5465 Bulwer Avenue, St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.
In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ont.

961

IT'S EASY TO SEE WHEN IT'S
DAY-BRITE
Lighting

AN ANALYSIS OF FIREPROOF FLOOR SYSTEMS

(*Continued from page 123*)

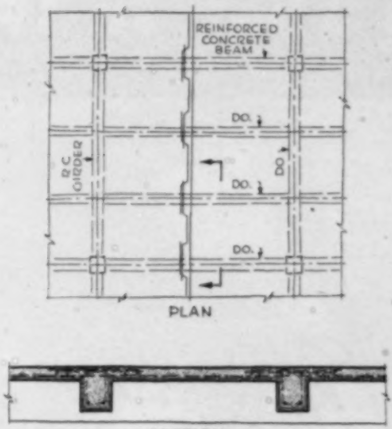
Type 7C and 7S. Solid Stone or Gravel Concrete, Short Span:* With structural steel framing, this system has all the advantages of Type 1 with following exceptions: Cost of slab is greater than cinder concrete mainly because of higher cost of aggregate and increased amount of cement required per unit volume of concrete. Since deadweight is greater, cost of framing and foundations is increased, and depth of supporting beams and girders must be greater.

With reinforced concrete framing, this system is more adaptable to floors with a heavier live load than usually found in non-industrial buildings. High cost of formwork required for numerous beams and girders, and amount of plastering for beam sides and soffits, would further tend to eliminate this type of construction. Welded wire fabric reinforcement may replace bar reinforcement shown.

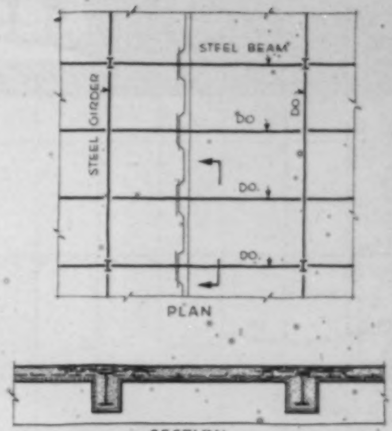
Type 8C and 8S. Two-Way Removable Metal Domes:* In general, this type of construction costs approximately the same as the more expensive types of two-way block systems. It is sometimes found advisable to use these domes in flat slab construction in order to reduce dead weight of the slab. A metal lath type ceiling usually is required for plastering.

Type 9. Flat Slab without Column Caps and Drop Panels: Cost is about equal to Type 5. Several of these flat slab systems have been used for relatively light loads but all are a modification of the ordinary flat slab without column caps and drop panels. Sometimes a structural steel column head composed of heavy shallow channels wholly embedded in the slab construction is used. For most economical design, column spacing should be regular, forming square or nearly square panels. Unlike other floor systems, use of steel columns or steel-core concrete columns does not materially increase speed of erection, and its use in multi-story buildings is limited.

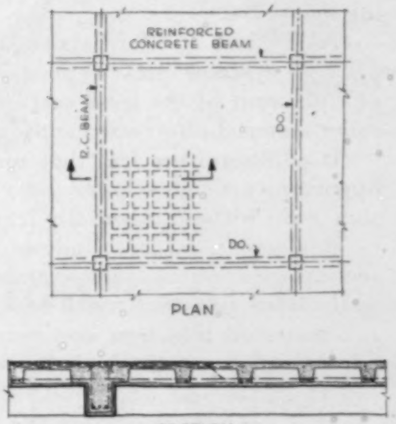
Type 10S. Cellular Sheet Steel Floors, Short Span:* Relatively high in cost at present due to requirement in large cities that all beams and girders, framing into columns, be individually fireproofed. Underside of floor and intermediate beams must be fire protected by suspended metal lath and ⅞-in. vermiculite plaster below the beams, and covered with a minimum of 2 in. of incombustible fill above the metal floor. However, it has the following important advantages: Cells can be used as raceways for wiring, and construction is lightweight and speedy. The increasing cost of reinforced concrete is undoubtedly closing the gap very fast between this type of floor construction and others.



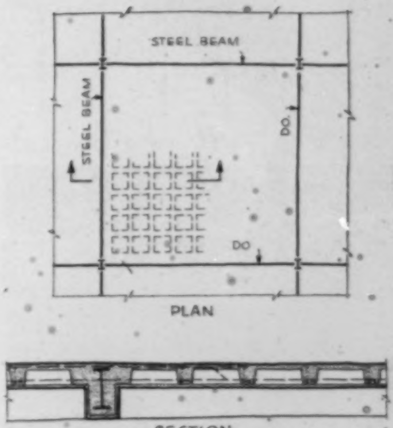
TYPE 7C
SOLID STONE OR GRAVEL CONCRETE, SHORT SPAN REINFORCED CONCRETE FRAM'G



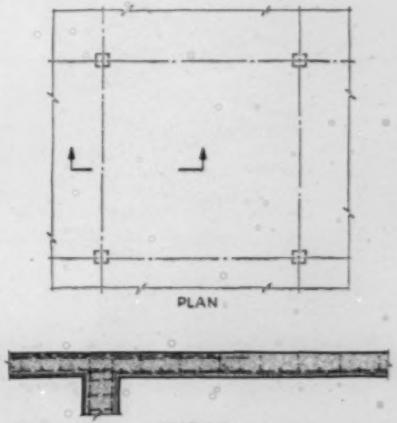
TYPE 7S
SOLID STONE OR GRAVEL CONCRETE, SHORT SPAN STRUCTURAL STEEL FRAMING



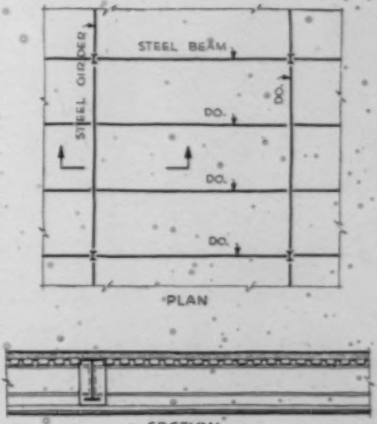
TYPE 8C
TWO-WAY REMOVABLE METAL DOMES
REINFORCED CONCRETE FRAMING



TYPE 8S
TWO-WAY REMOVABLE METAL DOMES
STRUCTURAL STEEL FRAMING



TYPE 9
FLAT SLAB WITHOUT COLUMN CAPS AND DROP PANELS



TYPE 10S
CELLULAR SHEET STEEL FLOORS SHORT SPAN
STRUCTURAL STEEL FRAMING

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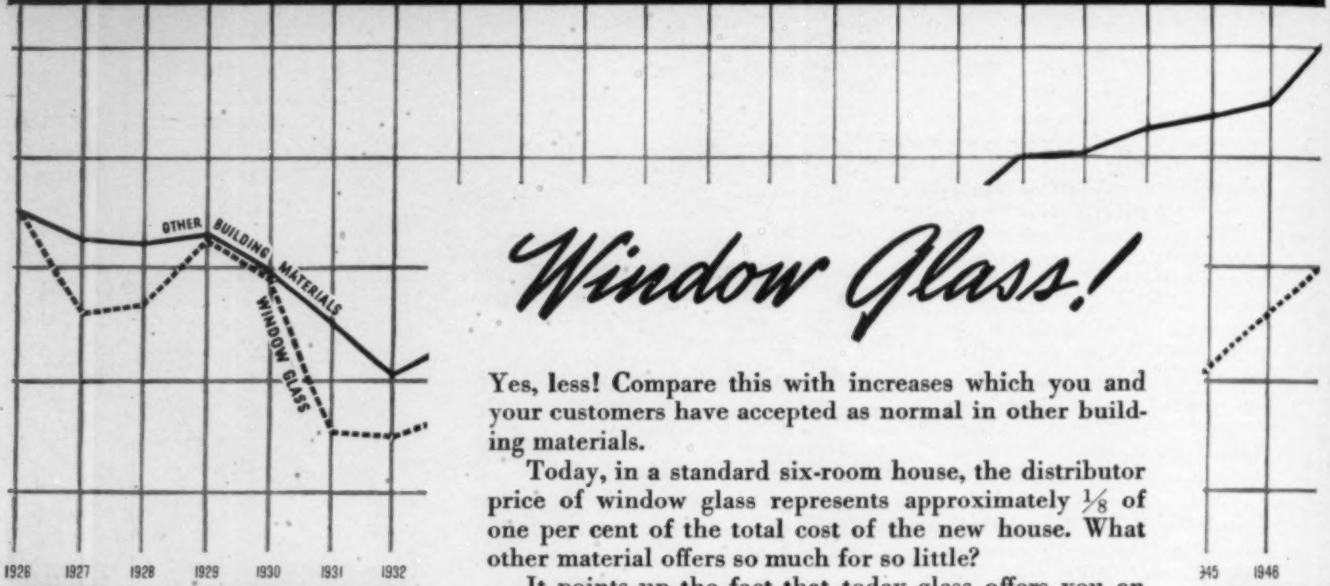
*C = Reinforced Concrete Framing; S = Structural Steel Framing

What Building Material Now Costs Less Than In 1926?



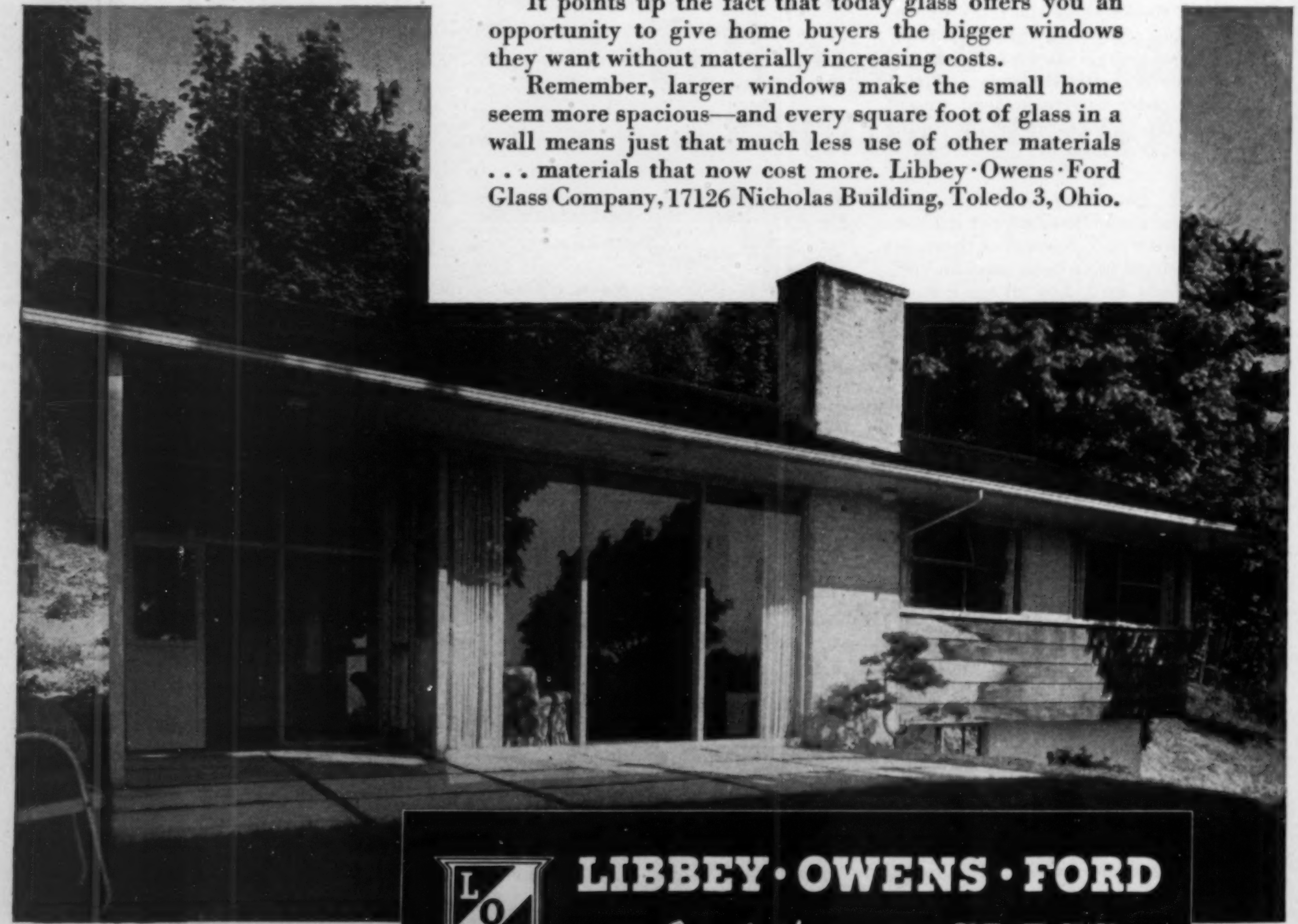
Window Glass!

Yes, less! Compare this with increases which you and your customers have accepted as normal in other building materials.

Today, in a standard six-room house, the distributor price of window glass represents approximately 1/8 of one per cent of the total cost of the new house. What other material offers so much for so little?

It points up the fact that today glass offers you an opportunity to give home buyers the bigger windows they want without materially increasing costs.

Remember, larger windows make the small home seem more spacious—and every square foot of glass in a wall means just that much less use of other materials . . . materials that now cost more. Libbey·Owens·Ford Glass Company, 17126 Nicholas Building, Toledo 3, Ohio.



Architect, Paul Thiry

LIBBEY·OWENS·FORD
a Great Name in **GLASS**

A house, too, can be "caught out on a limb"!

• Every architect and builder knows, of course, that you just can't beat bituminous coal for dependable, uniform, low-cost heat.

But even when a client *insists* on using some other fuel in his new home, be sure you give him the chance to change his mind sometime in the future—and turn to coal.

Otherwise, his house will be "out on a limb" when stoker developments, local coal heating services, cost differentials, or other factors convince him that he should get the benefits of coal heat.

This means: (1) provide a chimney with sufficient flue capacity to burn coal efficiently; (2) provide sufficient space adjacent to the heating unit for eventual coal storage and stoker installation.

The cost of taking such sensible precautions is negligible. And it constitutes valuable insurance of the future value of the home.

Coal supplies uniform, *steady* warmth throughout every portion of each room. For there's always a fire in the furnace—no "pop on and pop off" periods that permit accumulated heat to rise to the ceilings and leave floor areas dangerously cold. That, plus its low cost, is why more than 4 out of every 7 homes in the United States now heat with coal!

DON'T BUILD COAL OUT

Every new home you design or build should be planned to permit the efficient burning of coal—no matter what fuel may initially be selected. In two simple ways you can free any new home to turn to coal—the most plentiful and most economical fuel of all. This means:

1. Provide a chimney of adequate flue capacity.

2. Provide sufficient space adjacent to the heating unit for eventual coal storage and stoker installation.

BITUMINOUS COAL

BITUMINOUS COAL INSTITUTE
Affiliate of NATIONAL COAL ASSOCIATION
Washington, D. C.

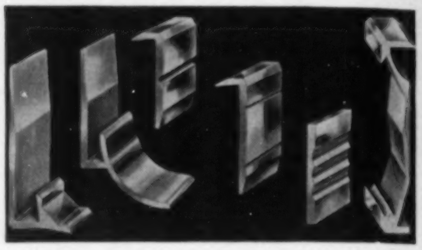
(*Continued from page 117*)

STORM WINDOW

A new combination storm window and screen is made of extruded aluminum which permits strong, narrow frames and a wide glass area. Both storm window panels and aluminum screen inserts reportedly can be changed quickly and conveniently, as the seasons demand, from within the house. A sliding panel and louvers at the bottom of the frame provide controlled ventilation. For warmer days, storm window inserts can be tilted for additional ventilation. Since even the screen "cloth" is of aluminum, the window should have exceptional rust-resistant qualities. The Eagle-Picher Co., Cincinnati, Ohio.

ALUMINUM MOLDINGS

New patterns have been added to an existing line of extruded aluminum moldings, as illustrated: (left to right) inside corner or edging, single flange cove, two types of counter nosing, batten strip, and tag molding. They are designed to allow for normal expansion and contraction of panels, and have wide flanges for easy fastening. Matched faces with the same beveled edges on all designs are said to aid perfect membering. For easy storage, identification, and handling, moldings are shipped in a new tubular package holding 24 pieces of either 8 ft. or 12 ft. lengths. The complete line also includes moldings made of plastic, *presdwood*, and stainless steel. Marsh Wall Products, Inc., Dover, Ohio.



New molding designs in aluminum

RUBBER FLOOR MATTING

A new type of floor matting is offered for industrial use to furnish a skid-proof and shock-absorbing underfooting, promoting safety and lessening fatigue among workers. Known as *L-CO* floor matting, this is a rubber-link floor covering similar to small rubber-link household mats. Sold by the sq. ft. in any size to meet specifications, it can be fitted to odd-shape rooms and is available in special-purpose mats for work areas or as a wall-to-wall covering. The Loewenthal Co., 188 West Randolph St., Chicago, Ill.

FLOOR PRESERVATIVE

A new preservative, *Lignophol Quick-Drying Finish*, is said to penetrate, preserve, seal, and finish in one application all types of wood floors subject to normal service, providing a gloss finish without undue darkening. It reportedly preserves the wood's resiliency, will not lap or spot, and is highly resistant to wear and the effect of water or alcohol. This finish needs no thinning or special preparation, and is reported to dry so quickly that treated area may be rubbed down within 15 min. after start of application. Waxing, if desired, may be done the following day. Building Products Div., L. Sonneborn Sons, Inc., 88 Lexington Ave., New York 16, N. Y.

LAMP BALLAST

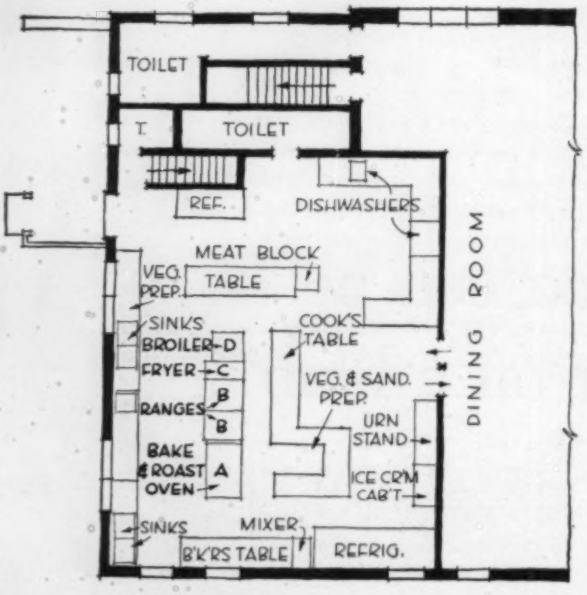
A new *Tulamp ballast* for the operation of two 12-in. *Circline* lamps is said to practically eliminate cylic light variation (stroboscopic effect), since the lamps are operated out of phase with each other. Flat-disc construction, with center hole for mounting, makes it

(*Continued on page 130*)

KITCHEN PLAN NO. 39: **Thirty-ninth of a series of successful mass-feeding kitchen appliances.**

This kitchen plan has been designed to provide production of a large menu in a very limited space, to a dining room seating 150 and a Rathskeller seating 50.

Keep for Handy Reference!



COOKING EQUIPMENT USED:
- (a) One No. 959 BLODGETT GAS-FIRED BAKING AND ROASTING OVEN
- (b) Two gas-fired solid top ranges
- (c) One gas-fired deep fat fryer
- (d) One gas-fired broiler

TECHNICAL DATA
IDEAS · ADVICE
INFORMATION
CONSULT YOUR FOOD SERVICE EQUIPMENT DEALER

In this case, tight space — usually inadvisable — has been successfully utilized for the production of an involved menu, because it was possible to combine baking and roasting in the one unit. The No. 959 BLODGETT OVEN here used has two sections each separately controlled. One section has two 42" x 32" x 7" baking decks; the other has one compartment 42" x 32" x 12". Extreme flexibility, ease of operation, and high production are provided in approximately 15 square feet of floor space.

The G. S. BLODGETT CO., Inc.
50 Lakeside Avenue **Burlington, Vermont**

The new deluxe edition of "Case Histories" is ready— write for it now!

Duran... Superb

IN THE FINEST SETTING

Chairs by Dorell Mfg. Co., Inc., Flushing, L. I., New York. Installation by Ralph Mernit, Inc.

Here is the fitting complement to your finest creation . . . a unique mating of grace and durability in a truly sensational upholstery covering. Shown here on the handsome aluminum chairs of the Sherry Netherland Hotel, Duran, the modern plastic marvel, merits your highest recommendation. Its flawless craftsmanship of finish, its rich colors, its lasting look of luxury distinctively express the exact atmosphere you plan to achieve. Though elegant to the eye and tempting to the touch, Duran is tough, durable and remarkably resilient with a strength all of its own. No fabric backing is required in this non-peeling, crack free material. Stains or smears leave no permanent blemish for Duran cleans as easily as porcelain. An incomparably distinctive upholstery covering, Duran can be used with equal distinction on walls, panelling or any surface with decorative potentialities.

For subdued dignity in a dining room, relaxing comfort in a restaurant, lively appeal in a lounge . . . for whatever motif your clients desire, suggest Duran for maximum effectiveness. Send for full information and samples today.

Upholstered with
masland
Duran
ALL PLASTIC

Proof Against:
- *Perspiration*
- *Grease*
- *Water*
- *Alcohol*

Resistant To:
- *Strain*
- *Wear*
- *Creasing*
- *Wrinkling*
- *Scuffing*
- *Sagging*
- *Fading*

THE MASLAND DURALEATHER COMPANY
3236-90 AMBER STREET, PHILADELPHIA 34, PA.

(*Continued from page 128*)

easy to assemble on the stem of a portable lamp or conceal in a lamp base, and is adaptable to shallow-type wall or ceiling fixtures. A new junction box which includes a mounting bracket is also available. Specialty Transformer Div., General Electric Co., Schenectady 5, N. Y.

GAS-FIRED FURNACE

Combustion chamber and radiator assembly of the new model of *Janitrol* gas-fired gravity furnaces, Series GC S-64, are constructed of all-welded 18-gauge special steel, with all larger joints seam welded by a special process that imposes a minimum of stress. Furnaces come in two sizes: for 75,000 Btu. and 100,000 Btu., both featuring automatic controls for maintaining even temperature and quiet operation. Standard equipment includes a flame-retention type burner with a special alloy flame diffuser, and a device designed to insure the proper mixture of gas and air and to direct secondary air to the burners. Furnaces have a baked gray hammerloid finish, rounded corners, and a front panel to conceal the controls. Units are reported to be easy to assemble, with a minimum of fasteners. Surface Combustion Corp., Toledo 1, Ohio.

TRUSSED RAFTER

Four typical designs of the *Teco Trussed Rafter* have been developed for spans of 24 to 32 ft., for 24-in. spacing, and 4 in., 5 in., 6 in., and 7 in. per ft. roof slope. According to the manufacturer of special hardware required, this type of wood rafter will save up to 400 ft. of lumber in a one-story two-bedroom house through the elimination of heavy bearing partitions. Rafter has four basic members and four hardware items, for prefabrication or assembly at the site. Timber Engineering Co., 1319 18th St., Washington 6, D. C.

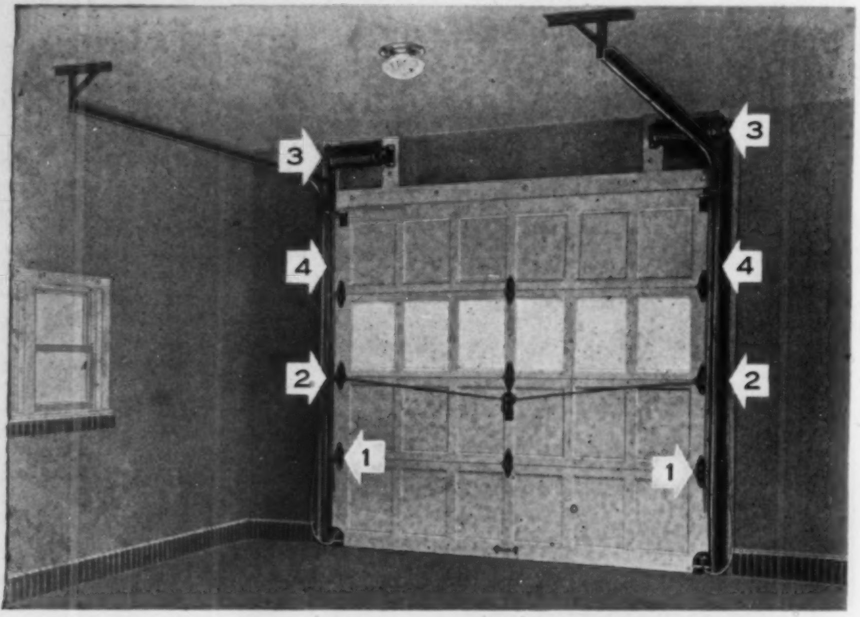
HOME INCINERATOR

An automatic gas-fired refuse disposal unit, the *Calcinator*, is only 18 in. wide, 24 in. deep, and 36 in. high, finished in white enamel for the kitchen, or in baked aluminum finish for utility room, basement, or garage. Said to be smoke-proof and odorless, the disposal unit employs a gas flame smaller than that of a bunsen burner and a down-draft principle to dry the refuse, such as garbage, and then set fire to the dried material. Combustion is reportedly so complete that ash removal is required no oftener than once a week. Calcinator Division, Valley Welding & Boiler Co., Bay City, Mich.

RIPPING AND SIZING SAW

Developed as companion equipment to the Linderman automatic wood prefabricating machine, the *Universal Model 50* power saw can be bought separately for high-production ripping and sizing work. Built on a one-piece steel main frame, it will edge or size panels from 1½ in. to 37 in. in width, or wider when an extension to the carriage is used. A 12-in. saw will rip stock up to 2 in. thick. The machine is provided with a gauge which can be set to the desired width on the graduated table so that all successive panels will be sized alike. Feed-chain links are corrugated and angled so that lumber will travel against the feeding guide during cutting. Four pressure rolls hold the lumber firmly against the chain and assist in holding the wood against the feeding guide, which reportedly assures a perfectly straight cut at all times. Several variations in chain speed are available to take care of different types and thicknesses of lumber. The main countershaft is driven by a standard 10 hp. motor through a multiple V-belt drive. Floor space required is approximately 5 by 5½ ft., including both table and guard. Muskegon Machine Co., Inc., Newburgh, N. Y.

(*Continued on page 132*)



Only the **Barcol OVERdoor** *has All of these features:*

1. Weathertight, rattleproof closing without sticking or binding. Roller-crank action.
2. Self-latching. Spring bolts engage automatically when closing.
3. Tailored "Twin Torsion" balance springs. Safe and quiet. Neat appearance.
4. Continuous vertical track brackets on all doors. Rigid. Conceal and protect cable.

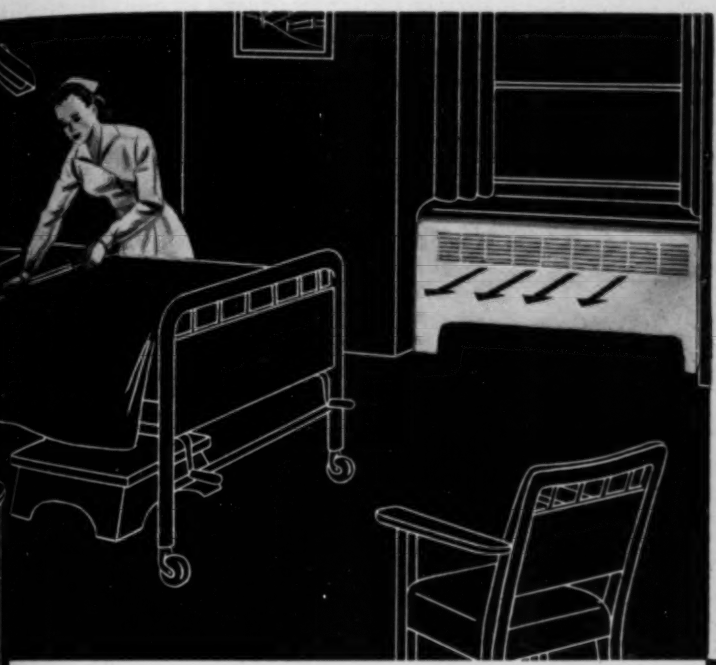
BARCOL

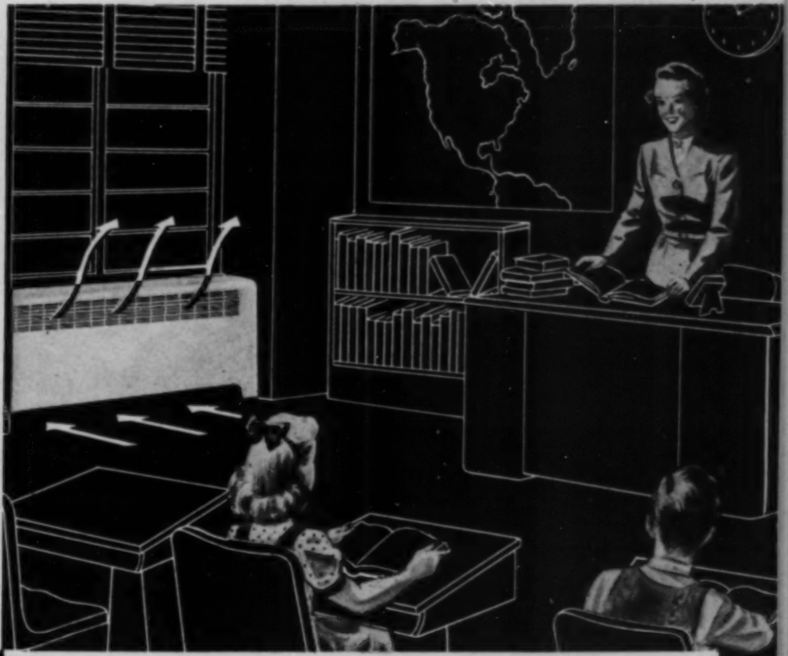
FACTORY-TRAINED SALES and SERVICE REPRESENTATIVES IN PRINCIPAL CITIES

BARBER-COLMAN COMPANY
102 MILL ST. • ROCKFORD, ILL.

TWO KINDS OF HEAT IN ONE GREAT MODERN BLEND!

– that's what Modine Convectors offer you!





1

RADIANT HEATING

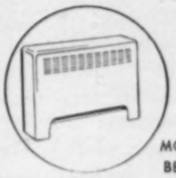
Mild, radiant heat in just enough quantity to offset heat loss from window areas — that's what those arrows represent, coming from the Modine Convector Panel below the window. To this we add . . .

2

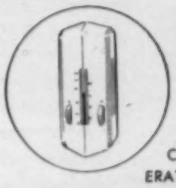
CONVECTION HEATING

Warmed air gently circulated throughout the room by Convection heating. Hot water or steam passes through copper heating unit which draws cooler, floor-line air into bottom of convector where it's warmed, rises and passes out through grille.

RESULT: A modern, blended heating system for modern winter comfort — whether it's school, hospital, home or apartment! A heating system that gives you individual room control . . . gentle, draft-free air circulation without the use of moving parts that wear out! Yes, the dependable heating comfort, distinctive charm, space saving, cleanliness, and long service life of Modine Convector Radiation is recommended for all types of residential and institutional heating needs. Look for Modine's representative in the "Where to Buy It" section of your phone book. Write for complete information and free descriptive literature. MODINE MANUFACTURING CO., 1773 Racine St., Racine, Wis.

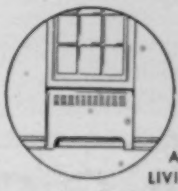


MODERN BEAUTY



CLOSE TEMPERATURE CONTROL

EASY TO INSTALL



ADDS TO LIVING SPACE

PRICED FOR TODAY'S HOMES AND APARTMENTS

Modine

CONVECTOR RADIATION

The Modern "proved by use" heating method

(*Continued from page 130*)

CONTINUOUS PRINTER

An improved line of table-type printers is now on the market for reproducing direct-process black and white prints, blueprints, and ammonia-type prints from tracings, charts, drawings, and letters. Known as Harvey *B-2* and *B-3* printers, they are designed to produce prints up to 44 in. wide in a continuous operation; from cut sheets or roll stock, in any lengths, at speeds of from 6 to 42 in. per min. Rheostat gives finger-tip control. Moving individual fabric bands run in guides under automatically controlled tension, which are said to eliminate side travel, looseness, and wrinkling of prints. Peck & Harvey, 5736 N. Western Ave., Chicago, Ill.

FLUORESCENT FIXTURES

To simplify maintenance and servicing, several design changes have been made in the Sylvania line of fluorescent fixtures. In commercial fixtures, all ballasts are now fastened to the tophousing with special "Z" screws, making it possible to remove ballast without removing tophousing from the ceiling. In double-length industrial fixtures, models HHF-208 and HFF-308, starters have been relocated to a center position between the two reflectors, which permits the entire group to be serviced at once. Sylvania Electric Products, Inc., 500 Fifth Ave., New York, N. Y.

NIGHT-LIGHT SWITCH

For instant identification in the dark, *Permalite* wall plate contains a tiny electronic bulb built into the translucent plastic housing and operating on standard 110-volt alternating or direct current to furnish a soft red glow in the dark. Switch plate is simple in design and ivory in color. According to the manufacturer, plate can be installed in a few minutes with an ordinary screwdriver; operation costs only one cent a year. It is suggested for hallway, stairway, bedroom, bathroom, nursery, and garage installations, and for photographic darkrooms where red glow will not hamper developing activities. Universal Microphone Co., Dept. AR, Inglewood, Calif.

SCALE DRAWING PAD

Offered as a timesaver for conveying ideas quickly and graphically, a scale drawing pad, *Jiffy Sketch*, enables one to make properly proportioned freehand drawings without use of ruler or drawing board. Sketch pad contains 75 sheets of tracing tissue, approximately 9 by 11 in., within a cover jacket with cardboard flaps on which are printed graphs of varying scale. To use the pad, one folds flap of the desired scale under tissue sheet to act as a guide. Since there are no ruled lines on the tissue to confuse the finished drawing, the sketch pad should offer the advantages of graph paper without its disadvantages. On the reverse of the flaps are printed various architectural and engineering symbols for the help of students. Sheets are perforated for easy removal, and may be blueprinted. Jiffy Sales Co., 1851 East 37th St., Cleveland 14, Ohio.

SHOWER CABINET

Sidewalls and top frame of *Stylite Shower Cabinet* are made of 20-gauge steel with white enamel; floor and base are finished in black enamel, with a footing that is chemically treated to provide a non-skid surface; and exposed fixtures are chromium plated. The entire unit is designed for easy assembly without bolts or screws. Drain and strainer are made for a 2-in. inside caulked soil pipe to lessen cost of installation. The receptor is recessed to allow suitable clearance. Fixtures fur-

(*Continued on page 134*)

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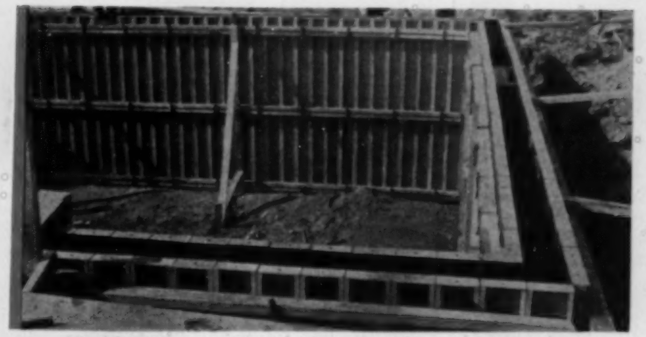
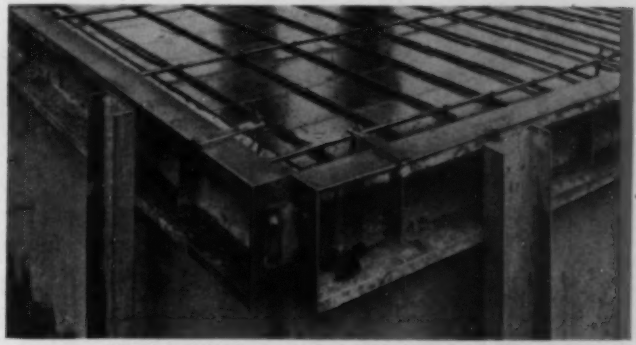
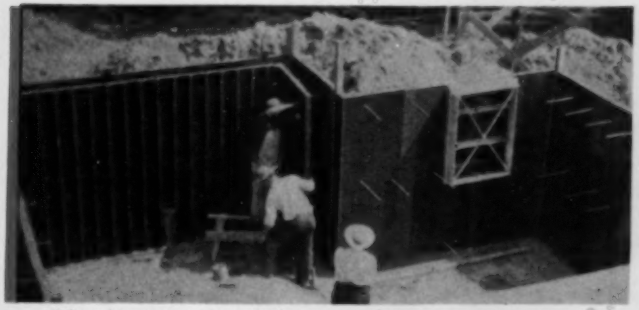


Steel Forms line up straight and true—Easy to set up, strip and move



Interchangeable forms can be used for floors or walls



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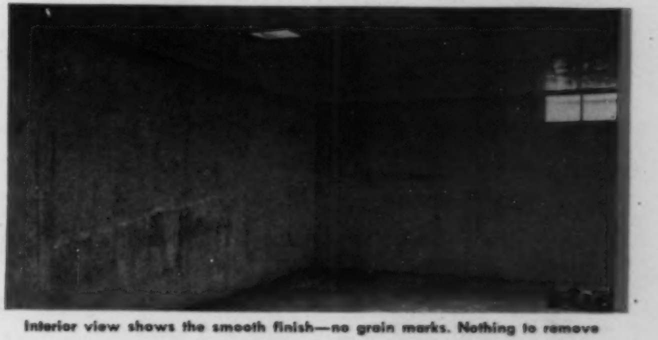

Interior view shows the smooth finish—no grain marks. Nothing to remove

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Atlas Steel Forms for every Purpose

(Continued from page 132)

nished with the cabinet include receptor, supply valve, shower head and arm, soap dish, curtain rod and hooks, white duck curtains, and drain and strainer. The Sanymetal Products Co., Inc., 1705 Urbana Rd., Cleveland 12, Ohio.

THERMOSTAT

Safety features are claimed for Cam-Stat *Model CD109A Thermostat:* no electrical parts exposed beneath the screen, and all current carrying parts enclosed within a Bakelite housing behind the wall plate. No larger than an ordinary light switch, this thermostat extends outward less than 1 in. from the wall, and is reported to be easy to install to a conventional conduit box. Current-carrying capacity is 1500 volt-amps, ¼ Hp., and 125 volt-amps pilot duty at 120 through 240 volts alternating-current. Range is standard at 50 to 100 deg. F. with a differential of 2 to 3 deg. F. Cam-Stat, Inc., Dept. AR, 2037 South La Cienega, Los Angeles, Calif.

STANDARDS

Pine Stock Doors

After acceptance by a satisfactory majority of manufacturers, distributors, and users, Commercial Standard CS120-46, Ponderosa Pine Stock Doors, is announced. It provides minimum specifications for these doors in four nominal thicknesses, ¾ in., 1⅛ in., 1⅜ in., and 1¾ in., covering construction, grades, and tolerances. Major changes include deletion of 18 designs and addition of two new ones, and an improved listing of standard sizes, segregated according to designs and use. National Bureau of Standards, Washington 25, D. C.

Plywood

Upon recommendation of Hardwood Plywood Institute, a revision of Commercial Standard CS35-42, Plywood (Hardwood and Eastern Red Cedar), is being circulated for acceptance. Among changes proposed are a complete revision of all grades according to present manufacturing practice and use, inclusion of a tabular form for easy comparison of defects permitted in various grades and species, and deletion of eastern red cedar, a softwood. National Bureau of Standards, Washington 25, D. C.

Asphalt Tile

A proposed Simplified Practice Recommendation for Asphalt Tile, suggested by Asphalt Tile Institute, is available for consideration, comment and approval. Recommendation would establish simplified lists of sizes and colors of asphalt tile and cove base adequate for all ordinary needs. Division of Simplified Practice, National Bureau of Standards, Washington 25, D. C.

Insulating Boards

Before the industry for acceptance is a revision of Simplified Practice Recommendation R179-42, Structural Insulating Board (Wood or Other Vegetable Fiber), proposed by the Insulation Board Institute. Among other revisions, a number of standard stock-production items are no longer recommended, including thin board, and a simplified list of recommended sizes, thickness, edges, and surface colors has been added for interior boards. Division of Simplified Practice, National Bureau of Standards. Washington 25, D. C.

Metal Lath

Revised 1946 edition of "Metal Lath Specifications for Better Plastering and Concrete Stucco" gives latest recommendations of the industry covering quality of materials and methods of application for all types of metal lath (expanded, ribbed, and sheet). Metal Lath Manufacturers Assn., Engineers Bldg., Cleveland 14, Ohio.

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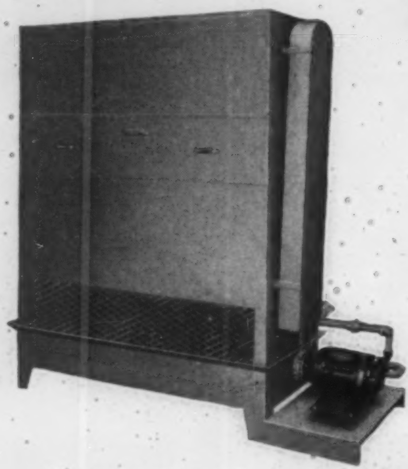

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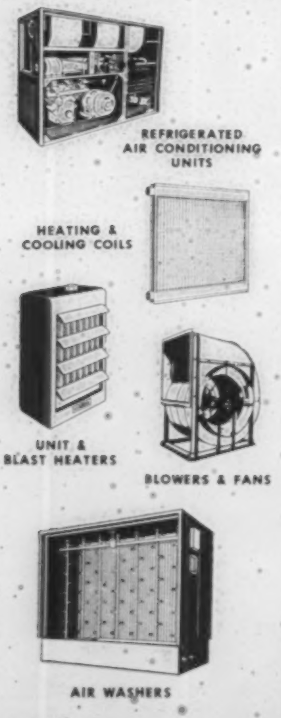

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THE RECORD REPORTS *(Continued from page 20)*

housing needs of today's American family. Headed by J. Marshall Miller, director of the Planning and Housing Division of the Columbia School of Architecture, the course is designed to aid members of real estate firms, architects, government employees engaged in housing work, and others who are wrestling with problems of housing administration and management. Visiting lecturers will include Charles S. Ascher, director of Region 2 of the NHA; Hugh R. Pomeroy, director of the Westchester County Department of Planning and formerly executive director of the National Association of Housing Officials; and Edward Weinfeld, former State Commissioner of Housing.

A course in town planning, given jointly by an architect, an engineer and a sociologist, has been organized for Cooper Union Art School students of architecture. Staff for the new course will be Dr. Paul Zudker, architect and former dean of the Faculty of Fine Arts in the University of Lessing, Berlin; Prof. John A. Ely, president, Association of Chinese and American Engineers, and former dean of the School of Civil Engineering at St. John's University, Shanghai; Dr. Edwin S. Burdell, director, The Cooper Union, and former dean of Social Sciences at M.I.T. The concrete problem which will be the semester's class project is a planned program for the expansion of Rye, N. Y.

OFFICE NOTES

Offices Opened, Reopened

John K. Cross, Architect, formerly of Mackenzie and Cross, Architects, of Baltimore, Md., and more recently assistant project manager in the Washington offices of Irons & Reynolds, Inc., has reopened his office for the practice of architecture at 328 N. Charles St., Baltimore 1, Md., and 4716 Chevy Chase Blvd., Washington 15, D. C.

John A. Fletcher will open his office for the practice of architecture at 547 Landis Ave., Vineland, N. J., on January 2, 1947.

Kenneth H. Hess, Architect, has reopened his office at 32 S. Oak St., Ventura, Calif., following five years with the Army Air Forces.

Christopher P. Kantianis, Architect, recently released from active duty with the Navy, has opened his office in the Springfield Natl. Bank Bldg., Springfield, Mass.

André Merle Associates, Architectural Engineers, have reopened their offices in the Southern Bldg., Washington 5, D. C.

Alves D. O'Keefe, Architect and Consulting Engineer, has reopened his office at 401 E. Jefferson St., Plymouth, Ind., following completion of engagements in war projects.

Pace Associates, Planners, Architects, Consulting Engineers, have announced the opening of an office at 53 W. Jackson Blvd., Chicago 4, Ill. Associates in the firm are W. H. Binford, C. B. Genther, William B. Cobb and John F. Kausal, architects; Walter T. Stopa, industrial engineer; Morris C. Hertel, architect. Consulting engineers are Arthur W. Nelson, LeRoy H. Nettnin and Syberen F. Nydam. Field Superintendent is K. D. Farwell, civil engineer.

New Addresses

The following new addresses have been announced:

M. L. Barker, A.I.A., and G. Lawrence Ott, A.I.A., Architects, 4334 W. Pico Blvd., Los Angeles 6, Calif.

Arthur A. Kober, Contractor, 1630 W. Thompson St., Philadelphia 21, Penn.

Herman Charles Light, A.I.A., 8205

(Continued on page 138)

Draperies that CANNOT BURN protect patrons at the WALDORF-ASTORIA

POWDER ROOM to the STARLIGHT ROOF

Fiberglas fabric in dramatic Tropical Print—chartreuse on grey—has been used for the draperies and lamp shades in this charmingly feminine lounge. The famous *Starlight Roof* and other public rooms in the WALDORF-ASTORIA have achieved new fire-safety through clever use of Fiberglas fabrics in exciting prints and luscious solid colors. *Decorated by W. & J. Sloane, Contract Division, New York.*

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Bituminous-base paints and coatings.

THE RECORD REPORTS *(Continued from page 136)*

W. Third St., Los Angeles, Calif.

Robert W. Loomis, Structural Engineer, The Plaza Bldg., Windsor, Conn.

Don Muntz, General Contractor, 5542 E. Second St., Long Beach 3, Calif.

Oxychloride Cement Assn., Inc., 1028 Connecticut Ave., Washington 6, D. C.

George Wharton Pepper, Jr., A.I.A., Maurice Fletcher, A.I.A., and John Howard Taylor, A.I.A., Associated Architects, Lewis Tower, 225 S. 15th St., Philadelphia 2, Penn.

Firm Changes

Harvey P. Clarkson, A.I.A., and Serge P. Petroff, A.I.A., have announced the formation of a partnership under the firm name of Petroff and Clarkson, Architects, with offices at 26 E. 55th St., New York 22, N. Y.

W. C. Grant Co., Inc., Contracting Engineers, Indianapolis, Ind., announce that the four departmental branches of their expanded engineering division have been placed under the management of Erskine G. Roberts, engineer.

Industrial Designers and Builders Associates are changing their firm name to Construction Associates. Address, 639 S. Wilton Pl., Los Angeles 5, Calif.

Russell Lehmann and William Bartell have joined the architectural design staff of the General Electric Company's Home Bureau.

Col. James A. MacAlarney, recently with the Corps of Engineers, U. S. Army, has joined F. H. McGraw & Co., engineers and constructors, Hartford, Conn.

John A. Weaver, designer and architectural specialist for R. H. Macy & Co. from 1928 to 1942, has joined the staff of Raymond Loewy Associates, industrial designers.

APPOINTMENTS

The following appointments have been announced:

G. Lyle Belsley, assistant administrator of the NHA in charge of administration; he will be responsible for NHA management activities, including budget, accounting, personnel, training and administrative services.

Marshall Crossman, to the administrative staff of the Veterans Administration construction, supply and real estate service.

Archie J. Doolittle, assistant executive manager in charge of production, Eggers & Higgins, Architects.

G. J. Fink, executive secretary, Oxychloride Cement Association, Inc.

Andrew L. Harris, executive secretary of the Producers' Council.

Edward M. Howard, district engineer of the Asphalt Institute's territory comprising the six New England States.

Casimir Krulik, to the New York City Housing Authority's newly-created job of materials expediter.

Norman R. Miller, an assistant to the director of field operations of the NHA.

Zoltan I. Poharnok, official American representative of the Hungarian Council of Arts; Mr. Poharnok will establish offices shortly.

Merrill M. Tozier, special assistant to Commissioner Dillon S. Myer of the FPHA.

ELECTIONS

Charles C. Platt, New York architect, has been reelected president of the Municipal Art Society of New York. A member of the executive committee of the Architectural League of New York and of the American Artists Professional League, he also has been elected a governor of the Real Estate Board of New York.

Tyler S. Rogers, of Toledo, Ohio, has been elected president of the Producers' Council.

The Society of Industrial Designers has announced the election of the fol-

(Continued on page 140)

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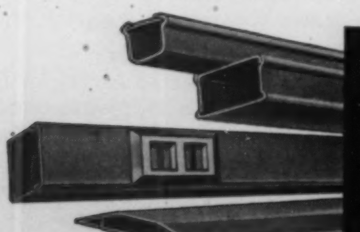

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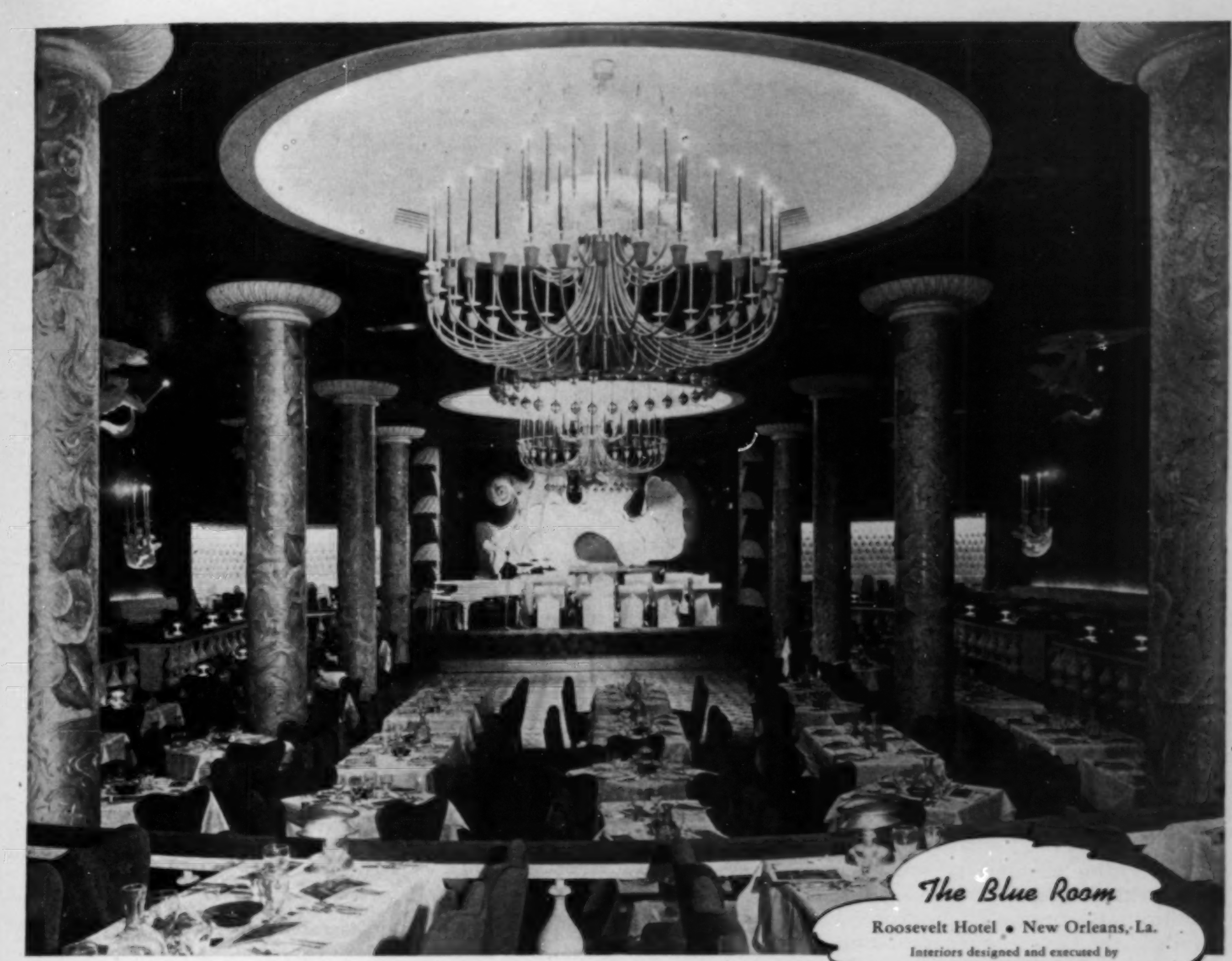

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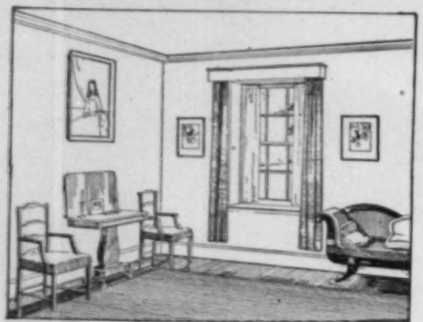
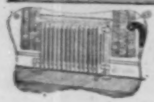
Where is the Radiator?





Make this test: Cut out illustration of radiator. Place cut-out picture in position under window in living room above. See how presence of radiator in room interrupts whole scheme of decoration and cuts down usable floor space.

Webster Baseboard Heating will take the radiator "out of the picture" in your home of tomorrow. In this patented new development the heating element fits behind a specially built metal baseboard. Air goes in at floor line, passes over heating element, is warmed and comes out of slots at top of baseboard—constant, even circulation, with temperatures varying less than 2° F. from floor to ceiling.

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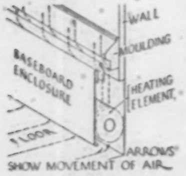

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BASEBOARD HEATING
—a post-war development by makers of Webster Systems of Steam Heating

THE RECORD REPORTS

(*Continued from page 138*)

lowing officers for the coming year: *president*, Raymond Loewy; *vice president*, Harold Van Doren; *secretary*, Egmont Arens; *treasurer*, Ray Patten.

BUILDING NOTES

New Store

Recently opened in Sacramento, Calif., the Joseph Magnin store was designed in accordance with the expressed desires of 50,000 women who answered a questionnaire sent out by Mr. Magnin.

One of the first considerations in planning the store, Gruen and Krummeck, the architects, report, was to make window shopping as agreeable and comfortable as possible. The plans, therefore, were drawn to create a shaped area setting the windows back behind a row of columns and making it possible for window shoppers to look at the merchandise in the shade.

Another feature is the use of aluminum venetian blinds which extend all the way around the arcade and go up and down automatically when the sun hits them.

The store, the largest women's apparel shop between San Francisco and Omaha, is windowless, has two floors and a mezzanine. The first floor, 17 ft. high, is a rounded oblong shaped room, in the center of which is suspended a massive lighting cove supported by two pillars. The two main counters, designed to give the appearance of growing out of the floor, are done in bronze.

Public Works Program

The New York State Postwar Public Works Planning Commission has approved more than $6.5 million of new construction for Harlem Valley State Hospital at Wingdale. The projects include a medical and surgical building, a building for disturbed patients, an addition to the power plant, and six staff residences.

Also approved by the Commission are four new structures, estimated to cost $6,193,450, for the College of Agriculture at Cornell University. Plans are now being prepared by Cornelius J. White for a library and classroom building, and by Coffin and Coffin for an agricultural engineering building. Also projected are an agronomy and an entomology building.

Seven additional projects for the extensive program of expansion at the Long Island Agricultural and Technical Institute, Farmingdale, also have been approved. Included are a combined auditorium and gymnasium and an industrial and technical building.

(*Continued on page 142*)

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Heating — Unit Heaters. Typical Heat sources. Boiler capacity. Characteristics. Location. Selection data. Capacities. Controls. Fresh Air connections. Pipe connections. Louvres. Grilles. Deflectors.

Basement Waterproofing. Impermeability of concrete cracks and joints in masonry. Hydrostatic pressure. Recommended concrete mixtures. Effect of curing time on permeability. Integral and membrane methods. Plastic and iron coating. Cement-base coatings.

Folding Partitions. Center hung doors. Pair-operated doors. Pockets. Passage through closed partitions. Door construction and soundproofing. Rolling partitions. Folding fabric partition.

Lighting. Recommended levels of illumination. Fixtures for filament and mercury lamps. Luminaire spacing. Room index. Coefficients of illumination. Layout suggestions. Conformity with structural design. Computed values of illumination. Lumen output of lamps.

Noise Reduction Acoustical Materials. A rule-of-thumb answer to what noise coefficient to use. Special applications. Materials for plastic application. Costs. Appearance. Design. Fire resistance. Light reflection. Heat transmission. Lighting. Pre-cast materials. Effect of paint. Acoustical Units: Wood framing; metal suspension systems.

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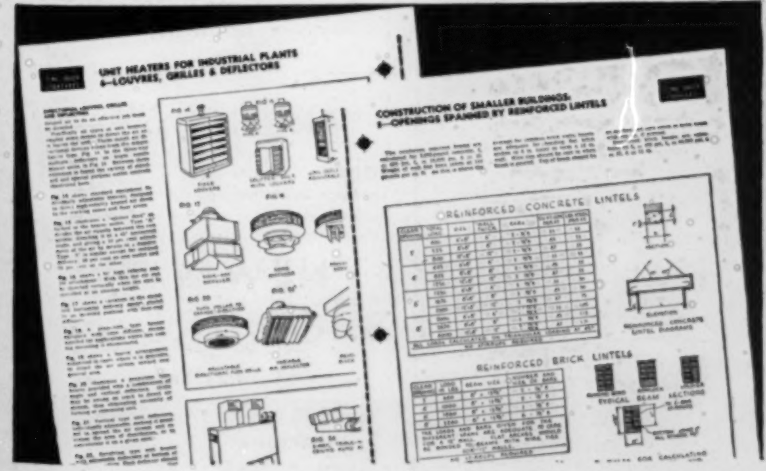
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THE RECORD REPORTS

(*Continued from page 140*)

VA Hospitals

Army Engineers have awarded architect-engineer contracts for two more Veterans Administration hospitals: for a 200-bed general medical and surgical hospital at Tallahassee, Fla., to Steward and Skinner, and Maurice H. Connell and Associates, assisted by James E. Edmunds, Jr., hospital consultant; and for a 500-bed general medical and surgical hospital at Little Rock, Ark., to Brueggeman, Swaim and Allen, and Erhart, Eickenbaum and Rauch.

New Type of School

From the *Weekly Bulletin* of the Michigan Society of Architects comes a description of a new type of school construction: the Vernor School, designed for the Detroit Board of Education by Eberle M. Smith and Associates, for which a novel treatment of natural lighting was developed in consultation with Geo. Schulz of the Detroit Board of Education.

"The fenestration," reports the *Bulletin*, "consists of a solid mass of directional glass block above the eye level running the full width of the room. This glass block is supported on a structural frame of steel and reinforced concrete. This frame extends beyond the exterior face of the glass block and forms a protecting canopy over the clear glass in steel sash which provides the visible fenestration. This clear glass is from eye level down to sill height.

"The steel sash sets back from the exterior plane of the glass block to the rear plane of the masonry closing walls. This is done to take maximum advantage of the recess provided by the protecting canopy over the top of the steel sash.

"The directional glass block deflects the light from outside sources upward and these rays of light are again reflected downward from the light colored acoustical tile ceiling, allowing the light to penetrate to the corridor side of the classroom.

"As the glass block prevents the rays of light of the sun from entering directly into the classroom, no shades are necessary to prevent glare from the sun light. The protecting canopy over the clear glass below the glass block makes it unnecessary to provide shades on these sash, so, by this combination, the troublesome use of shades to control the light in classrooms will be done away with.

"The exterior columns are designed V-shaped so as to provide maximum of entrance of light into the classrooms and to allow for the uninterrupted panel of glass block across the face."

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(Continued from page 120)

WIRE, ROD, STRIP

Alloys: Monel, Nickel and Inconel Wire, Rod and Strip (Catalog D-2). Characteristics of the various alloys, applications and qualities, tables of tensile strength, engineering data, size and weight tables. 28 pp., illus. Alloy Metal Wire Co., Inc., Prospect Park, Penn.

WIRE STRINGING

Engineering Memos: Successful Wire Pre-Stretching and Stringing. Instructions for wire-stretching and stringing. Diagrams, engineering information. 2 pp., illus. W. C. Dillon & Co., Inc., 5410 W. Harrison St., Chicago 44, Ill.

WIRES AND CABLES

Okobestos: "The Cable with the Asbestos Suit." Bulletin describing the principal types of Okobestos heat and corrosion resistant wires and cables. Includes detailed construction information, recommendations for type selection. Tables of allowable current-carrying capacities of conductors. 8 pp., illus. The Okonite Co., Passaic, N. J.

LITERATURE REQUESTED

The following individuals and firms request manufacturers' literature:

Leonard Bennett, Architect, Padre Sierra a Muñoz No. 26, Oficina. 6, Apartado de Correos No. 1.893, Caracas, Venezuela.

George D. Booth, draftsman, 1007 9th Ave., Laurel, Miss.

Building Materials Research, Council for Scientific and Industrial Research, Graham Rd., Highett, S.21, Victoria, Australia.

Dept. of Architecture, University of British Columbia, Vancouver, B. C.

Fair Lumber Co., Contracting and Materials, 170 Conrad St., San Antonio 3, Texas.

Kenneth Harry Hess, Architect, 32 S. Oak St., Ventura, Calif.

Thomas Larrick, Professor of Architecture, School of Architecture and Allied Arts, University of Florida, Gainesville, Fla.

Andre Merle Associates, Architectural Engineers, Southern Bldg., Washington 5, D. C.

Construction Manager, Nugents National Stores Inc., 370 W. 35th St., New York 1, N. Y.

Alves D. O'Keefe, Architect and Consulting Engineer, 401 E. Jefferson St., Plymouth, Ind.

Harner B. Scott, draftsman, 10 S. Laura St., Jacksonville, Fla.

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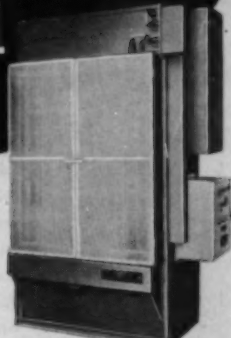

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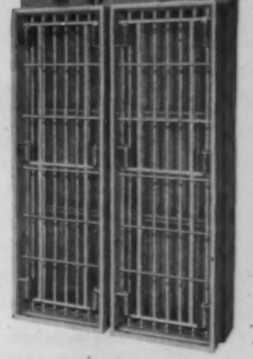

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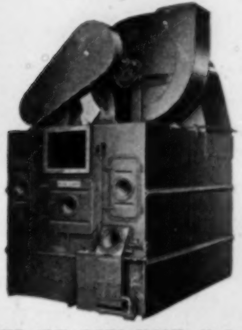

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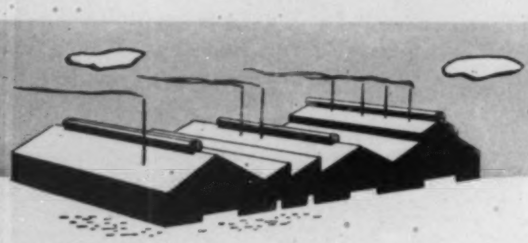

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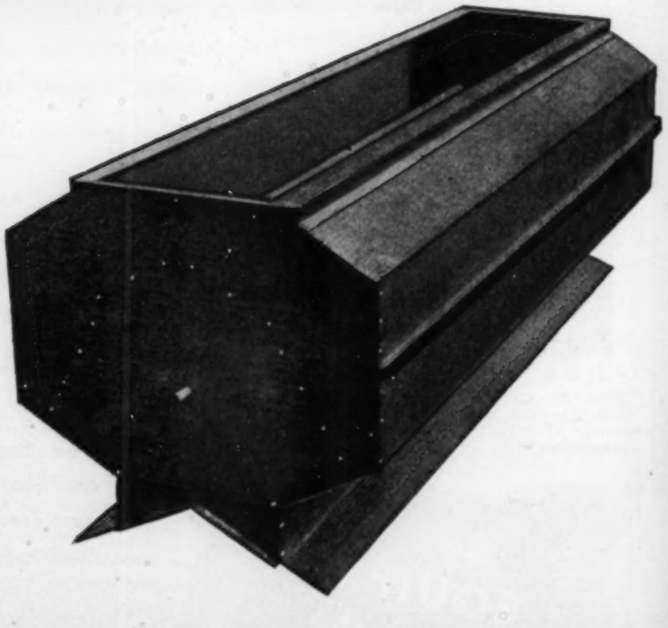

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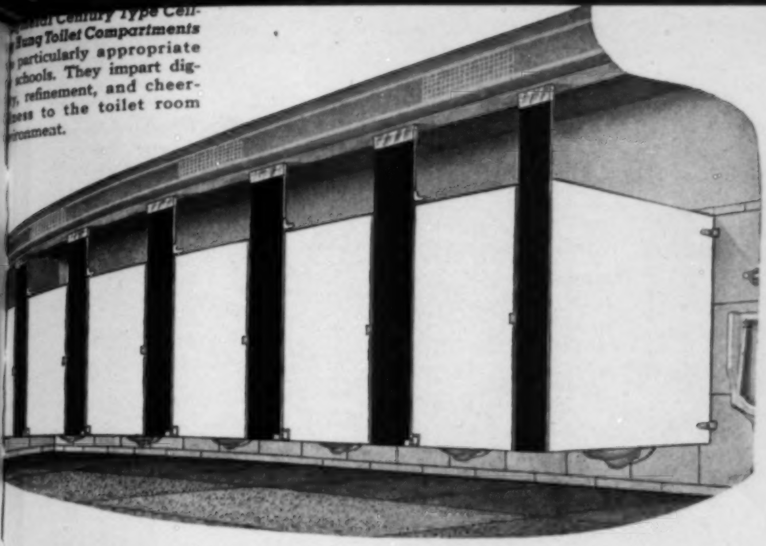

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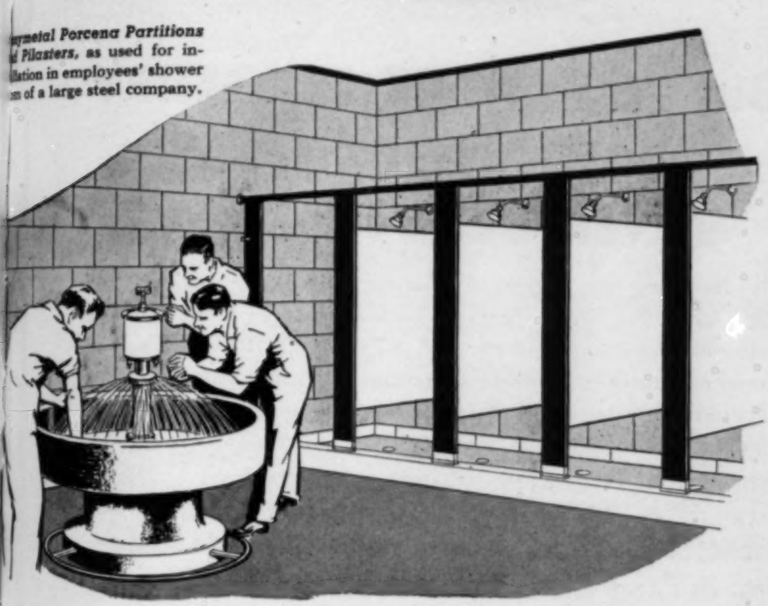

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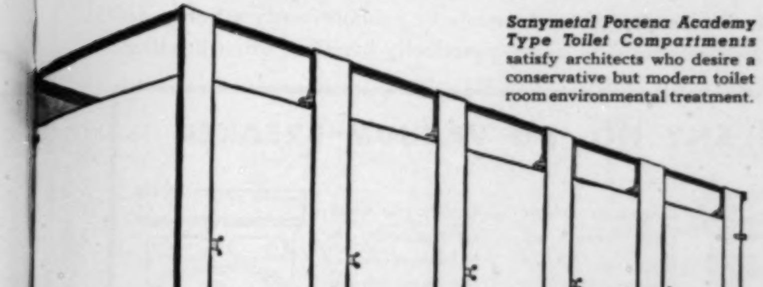

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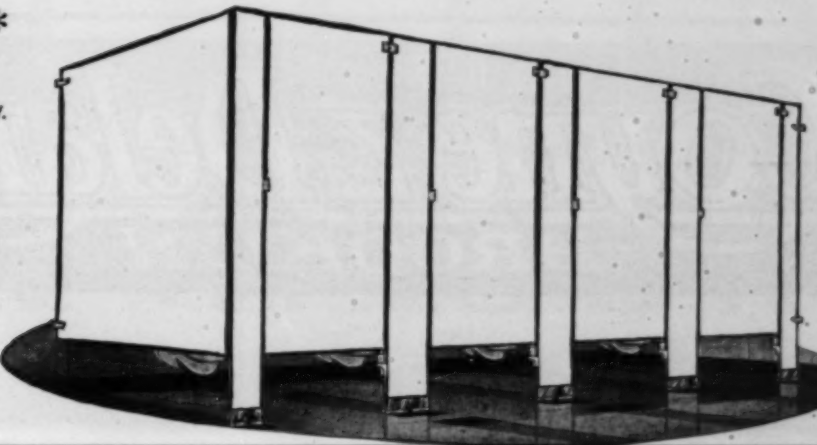

Sanymetal Porcena Normandie Type Toilet Compartments impart a moderately streamlined effect to a toilet room environment. Streamlined design wedded to utility fulfills all requirements.

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Right, Bacillus Typhosus, the causative organism of Typhoid Fever.

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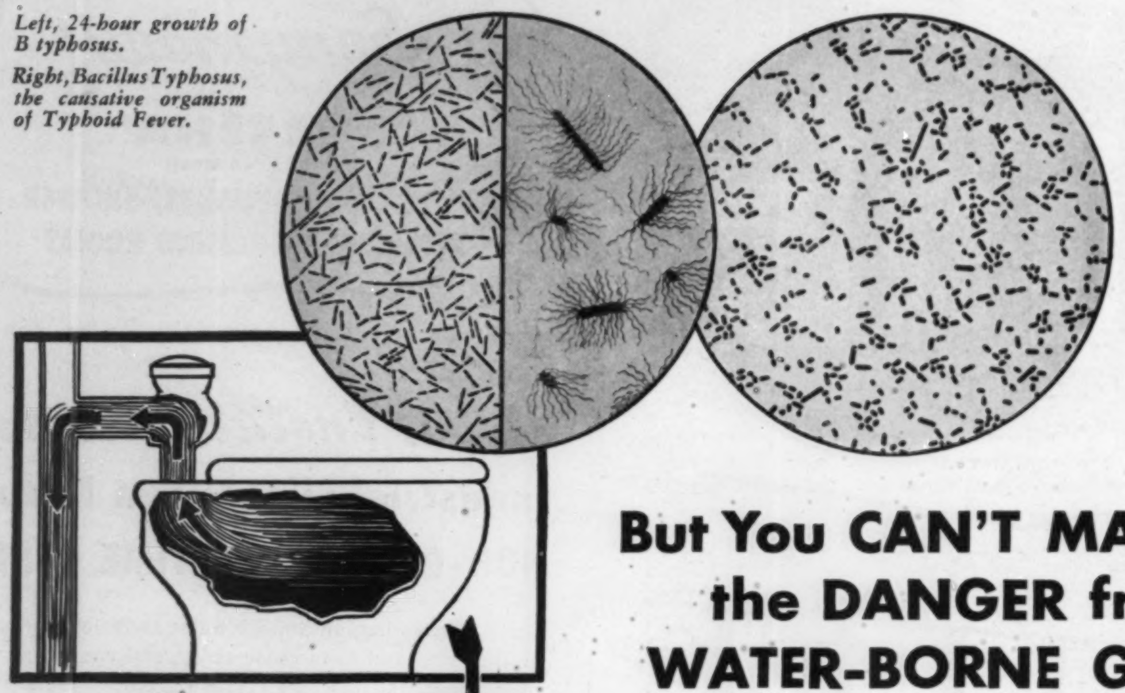

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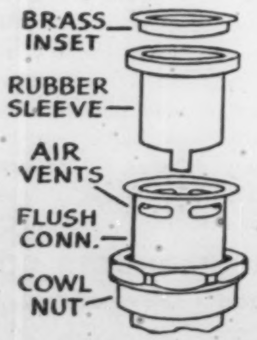

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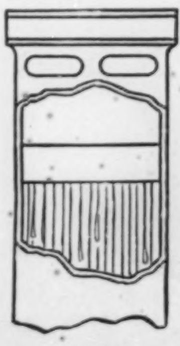

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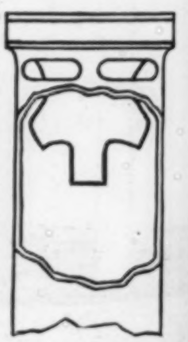

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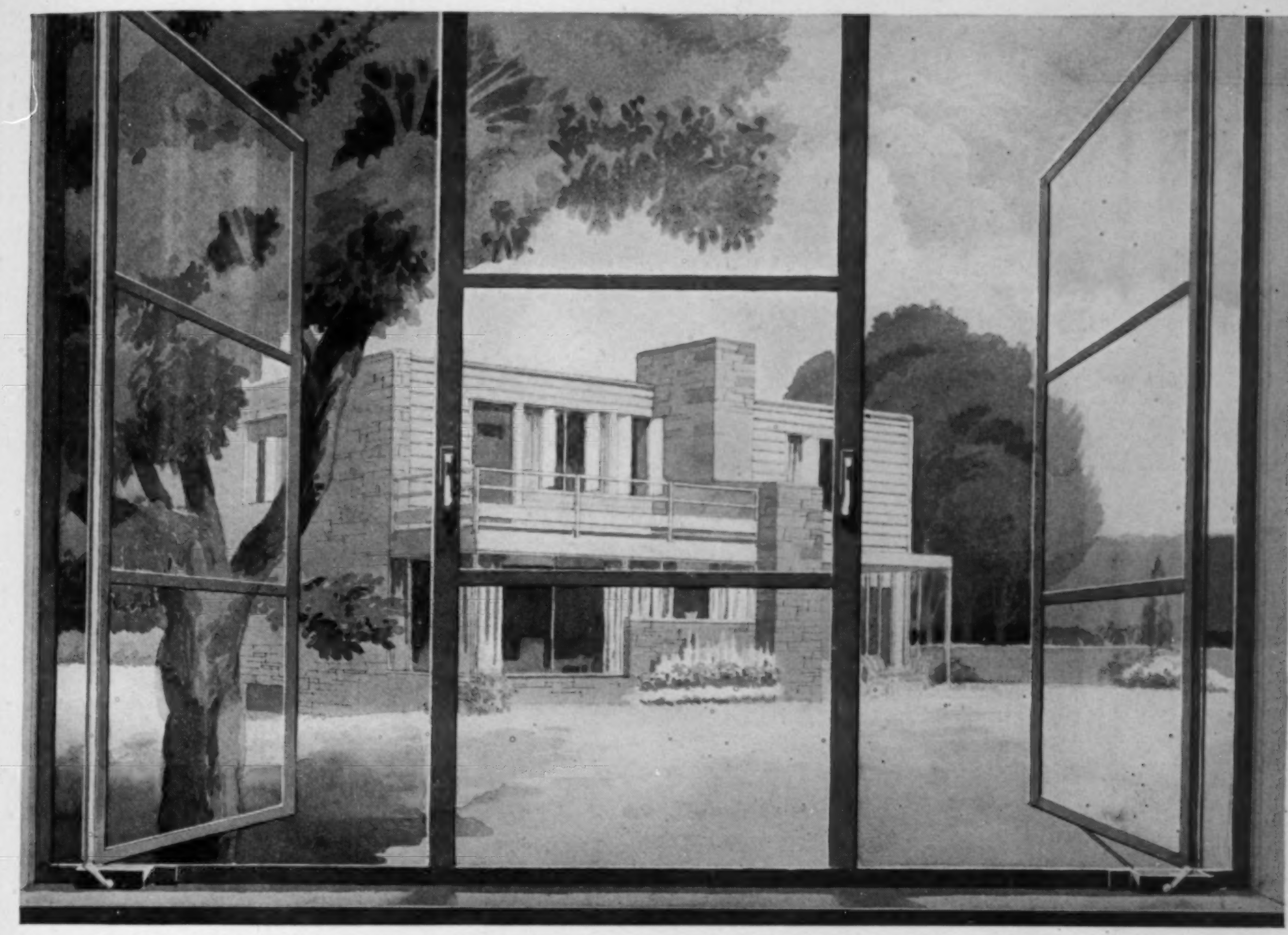

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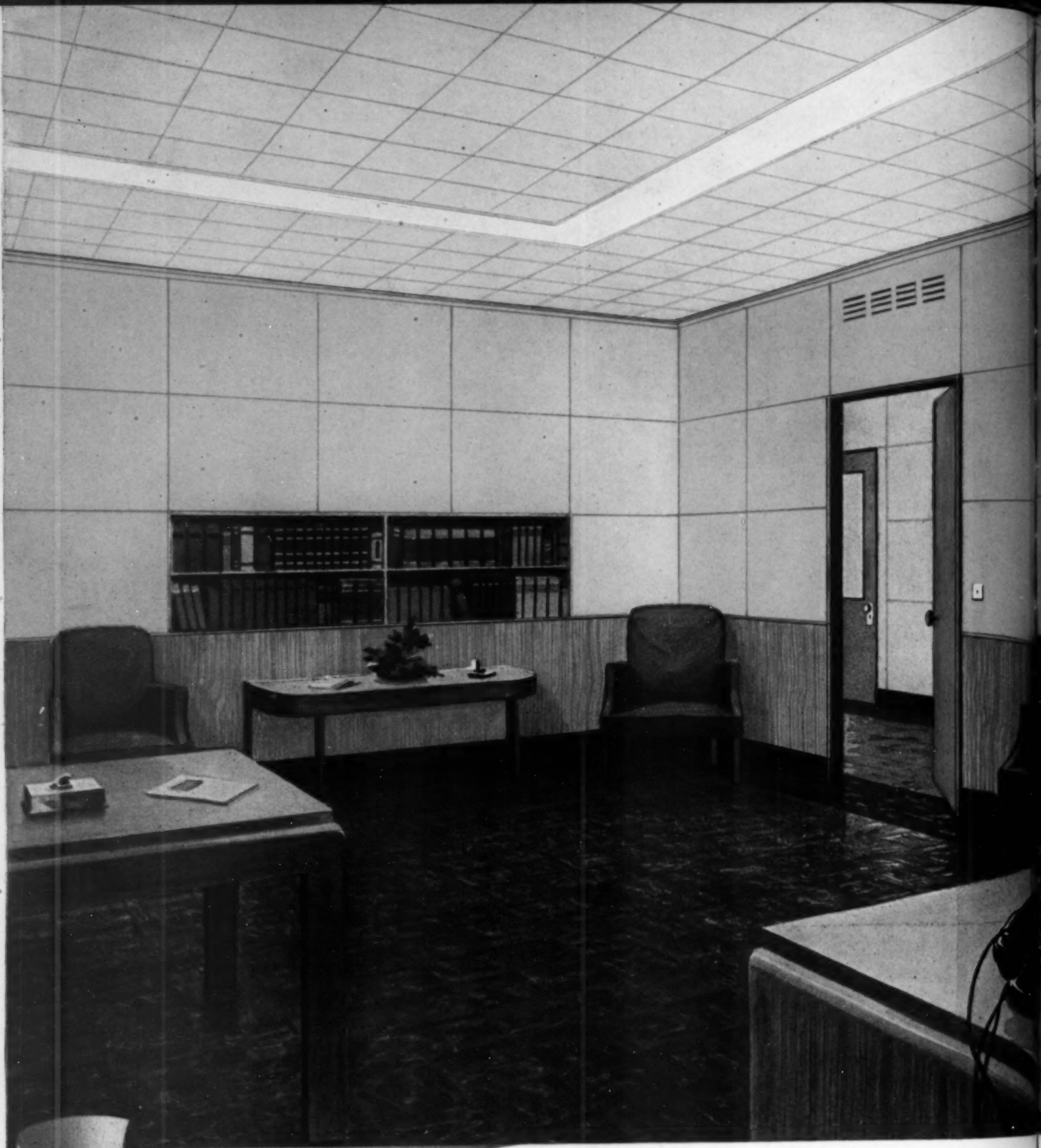

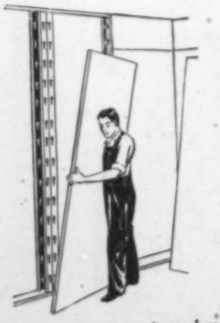

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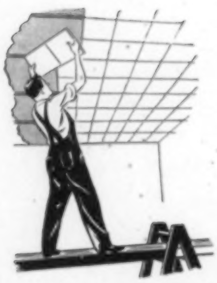

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- ACOUSTICAL CEILINGS

"Thine alabaster cities gleam"

In *all* the world, *only* in America can be found so great and shining cities.

They are, in one, both the symbol and the accomplishment of our aspirations. They are, in a way, America. Ask a couple of million returned GIs!

If beyond our alabaster cities we sense the roar of mighty machinery, the belching stacks of industry, the skill and sweat of human beings . . . they obscure not at all the handiwork. For in America we know that not alone with ideals, but with the "sterner stuff" of toil and resources shall a nation be moulded at last.

So, some practical dreamer it was, who watched the first *steel pipe* clank from the grimy benches about sixty years ago. Who, in shaping the hot metal, gave form and substance to fair cities yet to arise . . . cities that became realities because these *arteries* of steel could convey water, oil and other essential fluids, gas, steam and even some forms of solids, over long distances and to great heights.

Actually, the achievement of the modern city directly parallels the development and plentiful production of reliable, economically adaptable *steel pipe.* Yes, *steel pipe makes it possible!*

The interesting story of "Pipe in American Life" will be sent upon request.

Committee on
Steel Pipe Research
OF
AMERICAN IRON AND
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many. For he the first party
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Junior scientists will have elabor-
particularly the youth
You'll build or remodel better with Gold Bond

LOOKING for a way to get every last inch of space out of a housing project or an office or apartment building? Here's how the architects who designed New York's 295 Central Park West Apartments did it! By using the Gold Bond 2″ Solid Partition System with its special adjustable metal base for simple speedy construction, *the actual rentable space was increased 7%!* The resulting walls, built entirely of metal lath and gypsum plaster, are fireproof, durable, and effectively cut down room-to-room noise. All component parts are Gold Bond Products, designed and precision-made for speedy efficient assembly on the job. You'll find drawings and specifications of the system in our section of Sweet's.

Descriptive book with full details will be sent gratis upon request. Please specify Form 1080.

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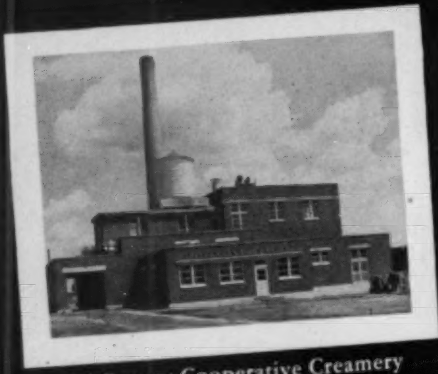
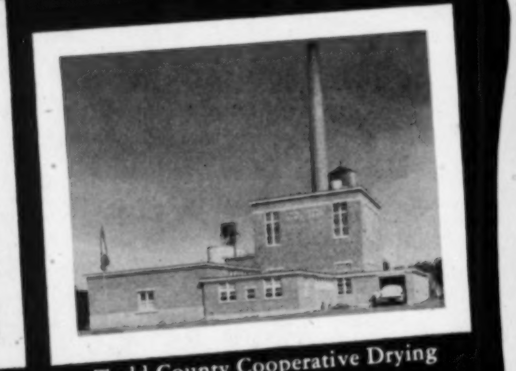
Over 150 Gold Bond Building Products including gypsum lath, plaster, lime, gypsum sheathing, rock wool insulation, metal lath products and partition systems, wall paint and acoustical materials.

ENTERPRISE Oil Burners *Specified . . .*



Tri-County Cooperative Creamery

Minnesota Valley Milk Plant



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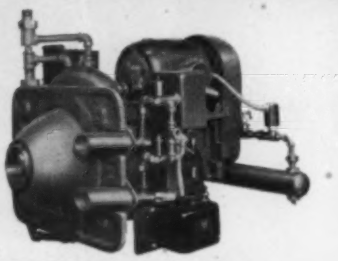

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Are furnished in Manual, Semi-Automatic and Fully-Automatic Models in combination with modulating fire control or special combinations to meet your specific requirements.

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V-Belt Drive permits the use of standard motors, which can be selected or easily changed to meet varying current requirements. Smooth, silent starting with cold, heavy fuel oils adds years to the life of the motor and burner alike.

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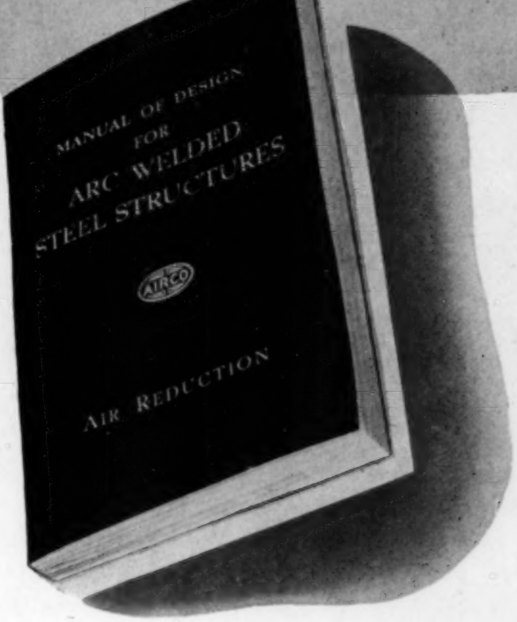

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Douglas Fir Plywood is Helping in the Construction of Houses for Veterans

Durable Douglas fir plywood—the engineered wood which cuts building time and costs—is now helping speed thousands of veterans' homes. A substantial portion of the industry's current production is allocated, on government order, to the Reconversion Housing Program.

Naturally, this means a tight supply situation for housing which does not come under the program, and for all other construction and industrial uses.

It is a fact, however, that more Douglas fir plywood is being produced today than in pre-war years. When the present overwhelming need for housing has been met, more and more of this modern "miracle wood" will become available for general use. Anticipate your needs well in advance. Keep in touch with your regular source of supply. Plywood's many advantages are worth the wait!

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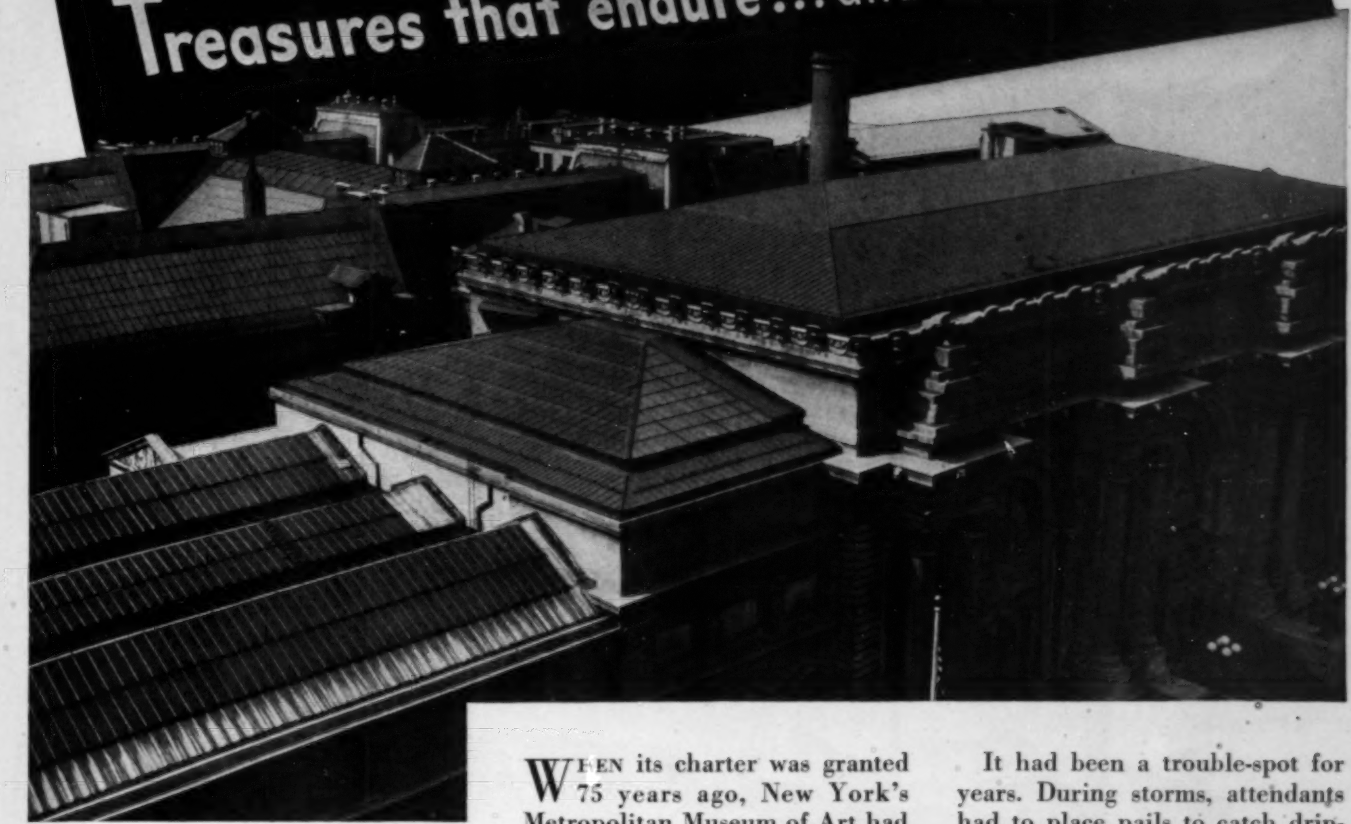
Treasures that endure... and a roof to match



METROPOLITAN MUSEUM OF ART, *Fifth Avenue, New York, installed Monel roofing 10 years ago to protect its famous collections from leaks and seepage. The Museum now plans large-scale construction and remodeling in connection with its 75th Anniversary program.*

VIEW OF MONEL GUTTER *and section of standing seam roofing and flashing installed in 1936.*

WHEN its charter was granted 75 years ago, New York's Metropolitan Museum of Art had no collections, no endowment, no land and no buildings.

The Metropolitan is now celebrating its Diamond Jubilee — as one of the great treasure houses of the world.

Its galleries and store rooms cover nearly 14 acres of floor space, and contain approximately a million works of art reaching through five thousand years of history.

Still growing, the Museum plans extensive new construction and reconstruction, to be brought about by the successful completion of its Diamond Jubilee Campaign. They'll simplify and regroup collections. They'll add new buildings, and completely modernize present facilities.

Naturally, for roof renovation and new construction, the Metropolitan will give special consideration to Monel*, the durable Nickel Alloy which they first used in 1936 to replace the Museum's old, faulty roof.

It had been a trouble-spot for years. During storms, attendants had to place pails to catch drippings from ceilings and skylights. Leakage endangered many priceless collections.

That picture changed after the installation of 120,000 square feet of Monel standing seam roofing ... Monel gutters, conductors, skylights, frames, siding and flashing.

Monel is rustproof. It's stronger and tougher than any other nonferrous roofing. It resists corrosion caused by chemicals in city air; it withstands the corrosive atmospheres of industrial and coastal areas. Its low co-efficient of expansion and high endurance strength reduce the possibility of fatigue failure.

To The Metropolitan Museum of Art, the properties of Monel assure dependable protection, long roofing life and low maintenance expense. *And these are the benefits your clients, too, will have — when you specify Monel for roofing.*

*Reg. U. S. Pat. Off.

Monel

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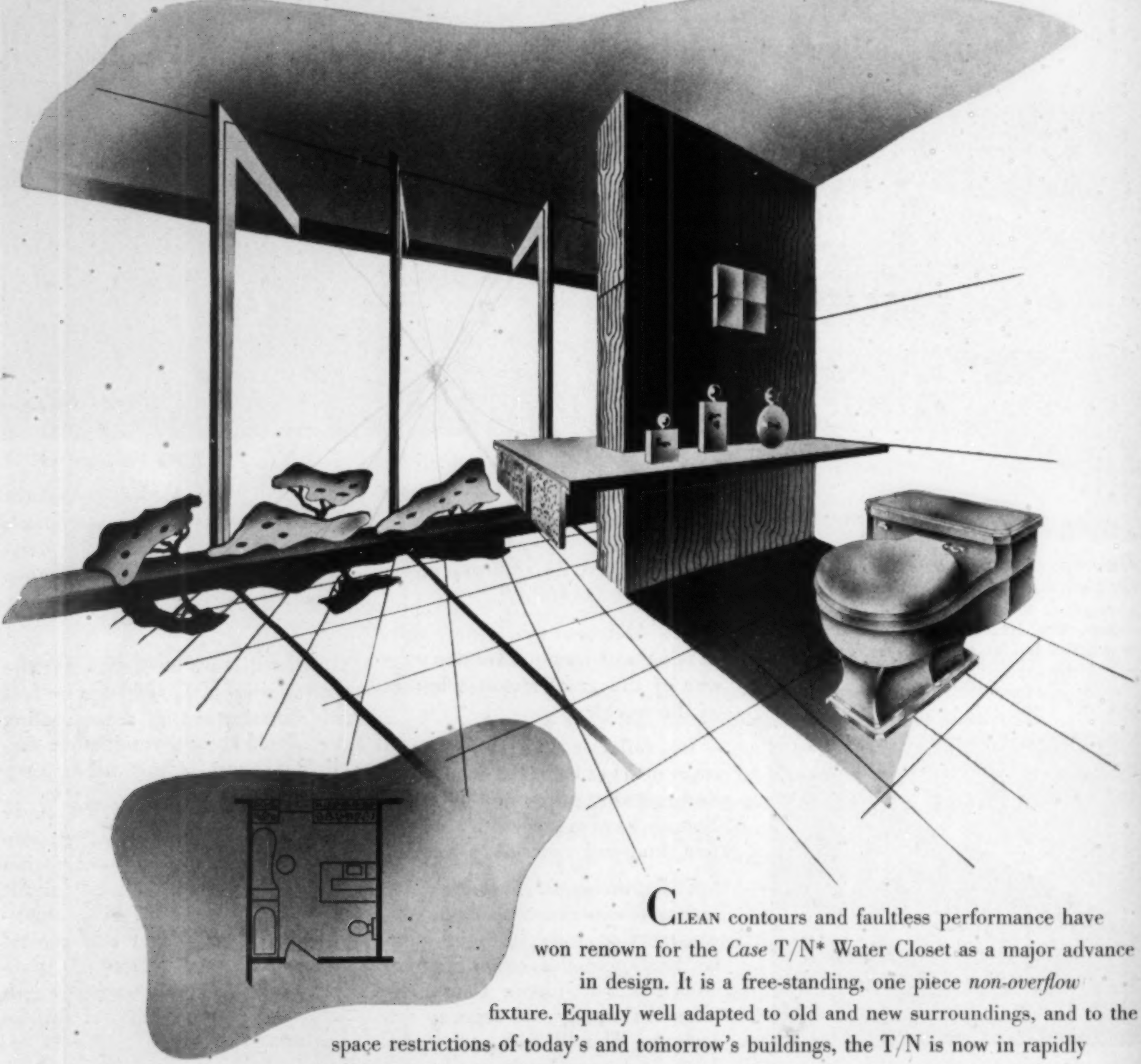

CLEAN contours and faultless performance have won renown for the *Case* T/N* Water Closet as a major advance in design. It is a free-standing, one piece *non-overflow* fixture. Equally well adapted to old and new surroundings, and to the space restrictions of today's and tomorrow's buildings, the T/N is now in rapidly expanding production. Distributed nationally—see your Classified Telephone Directory. W. A. Case & Son Mfg. Co., Buffalo 3, New York. Founded 1853.

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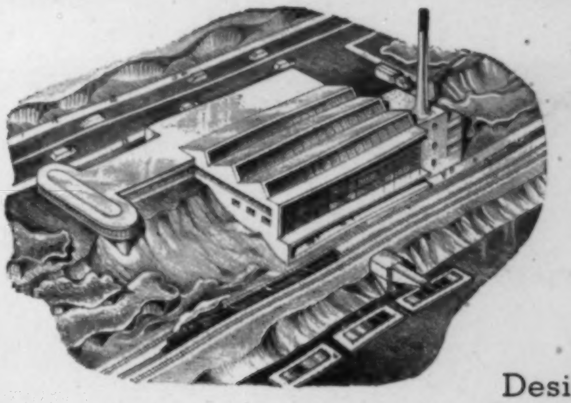

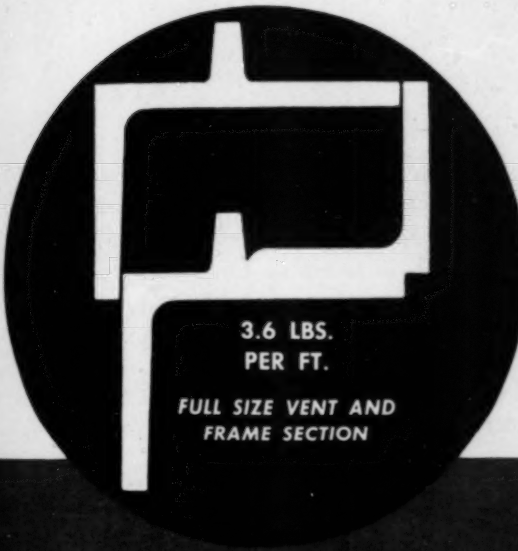
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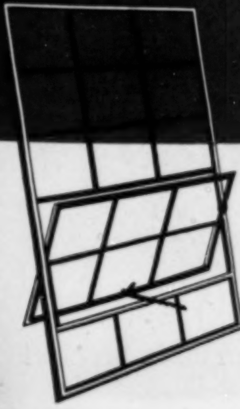

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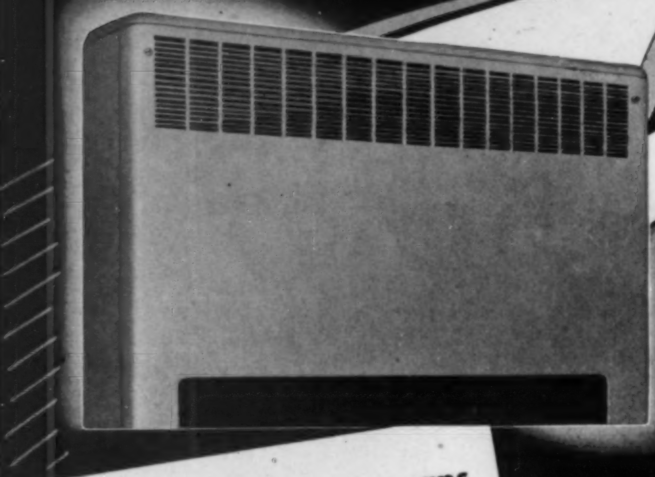
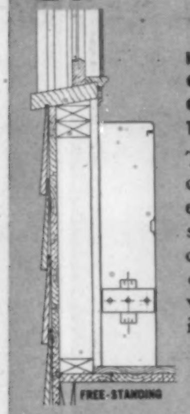


TRANE STANDARDIZES
the Convector-radiator
for Installation Direct from Stock

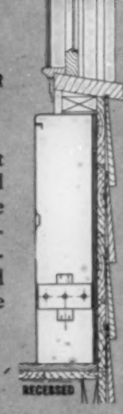
Here's what *standard* means

- 1 element for *both* steam and hot water.
- 1 cabinet style installed 2 ways.
- Sizes that fit most applications.

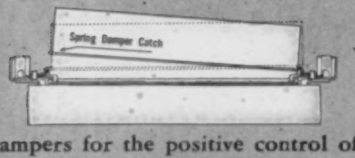


HOW THE TRANE CONVECTOR-RADIATOR CAN BE INSTALLED TWO WAYS

The same cabinet can be installed either as a free standing or recessed unit without change and with no difference in performance.



HERE'S A *PLUS* FEATURE



Dampers for the positive control of heat can be obtained and installed in two minutes without tools. Operated by an adjustable chain through the grill, these dampers give instant response without the use of valves.

For a complete description of the entire Trane Convector-radiator line, write for Bulletin DSB-380.

NEW MASS PRODUCED DESIGN FITS MOST HEATING APPLICATIONS

Here is the *standard* convection heating unit long demanded by architects, engineers, contractors, and wholesalers! In the new Type A design, Trane presents a Convector-radiator that operates equally well on steam or hot water—can be installed either free-standing or recessed—and is available in a range of sizes fitted to the needs of cottage, factory or skyscraper.

READY FOR INSTALLATION

Now, for the first time, Convector-radiators will be available from local wholesalers' stocks as a unit package completely assembled and ready for installation. Featuring Trane developments that reduce on-the-job time to a minimum, the new Type A units are mass produced for maximum economy—now cost no more to buy and less to install than old-fashioned radiators.

FOR THE UNUSUAL APPLICATION

Easy to specify, purchase, and install, Type A Convector-radiators are designed for the great majority of installations. However, for the unusual or special application, Trane still makes available the same extensive special purpose line that established Trane leadership in the convector field.

See your local wholesaler or nearest Trane field engineer for details of the new Type A Convector-radiator.

THE TRANE COMPANY
The House of Weather Magic
LA CROSSE · WISCONSIN
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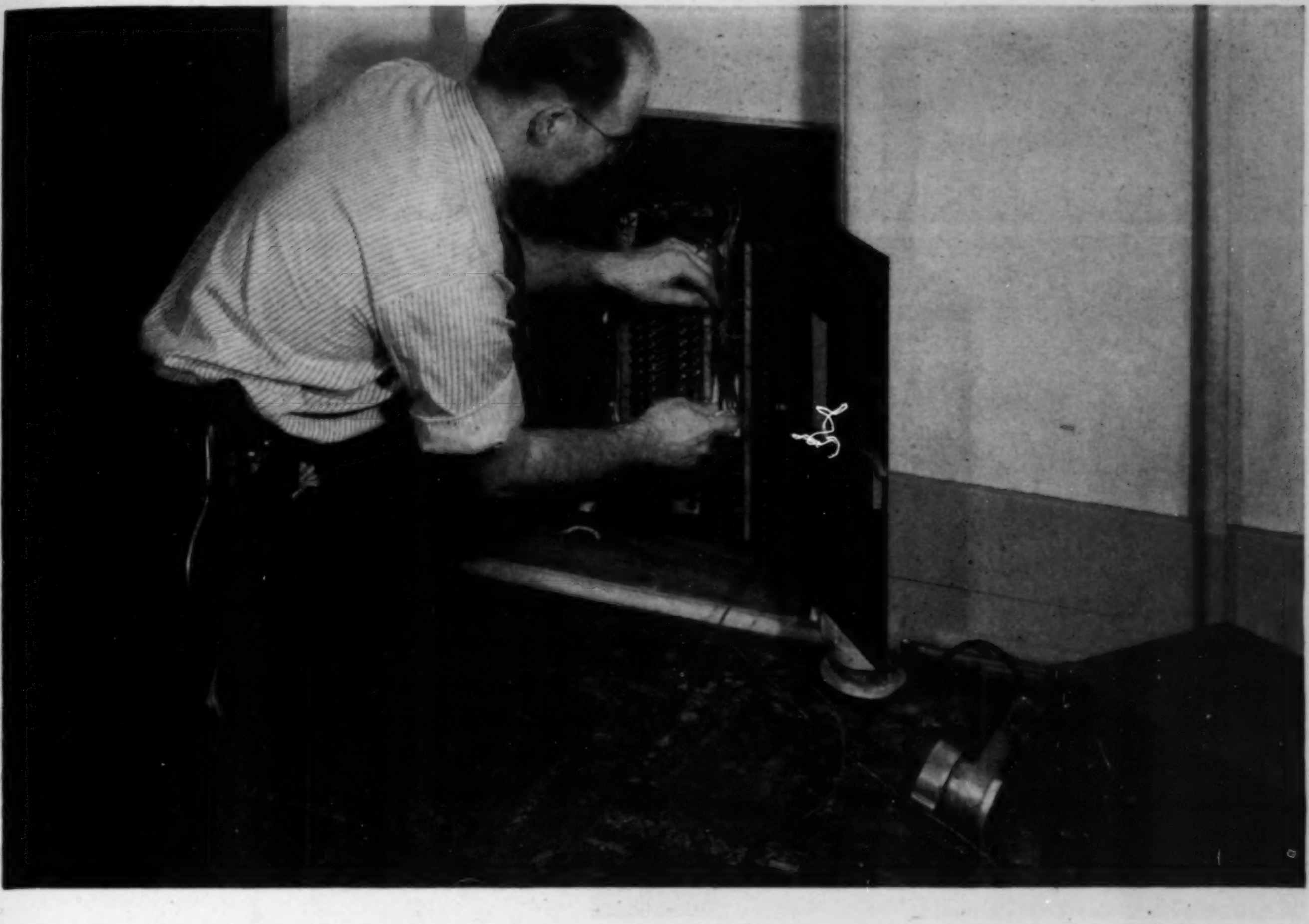
MANUFACTURING ENGINEERS OF HEATING AND AIR CONDITIONING EQUIPMENT



Station wire insulated with GEON makes hit with 'phone men

Some advantages apply to all types of manufacturing and construction

HERE are a few of the advantages of telephone station wire insulated with GEON: it strips fast, clean, easily; it's smooth, not sticky, easy to handle; the colors are clean and bright.

Then add the fact that the excellent electrical properties of insulation made from GEON permit a thinner coating. That means lighter weight, more conductors per conduit, or smaller holes to be drilled during construction.

In addition, insulation made from GEON is self-extinguishing—won't support flame. It resists most normally destructive agents such as ozone, oils, acids, air, aging, abrasion, water, and many others.

GEON's applications range from spaghetti for radio hookup wire to heavy insulation for buried service entrance cable. That's why we urge you to specify wire insulated with GEON the next time you order from your supplier. For information about special applications please write Dept. A-12, B. F. Goodrich Chemical Company, Rose Bldg., Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

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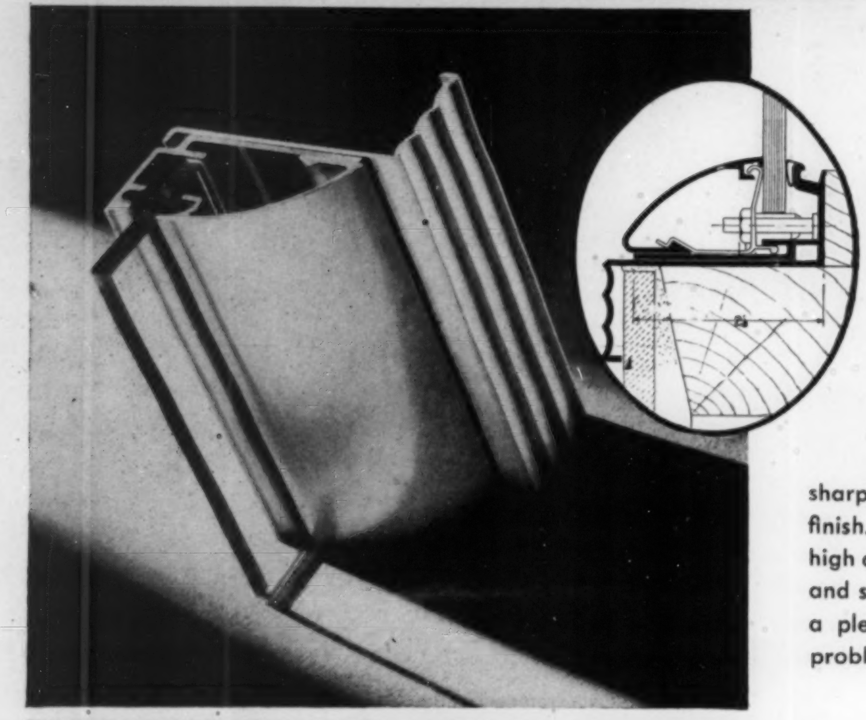
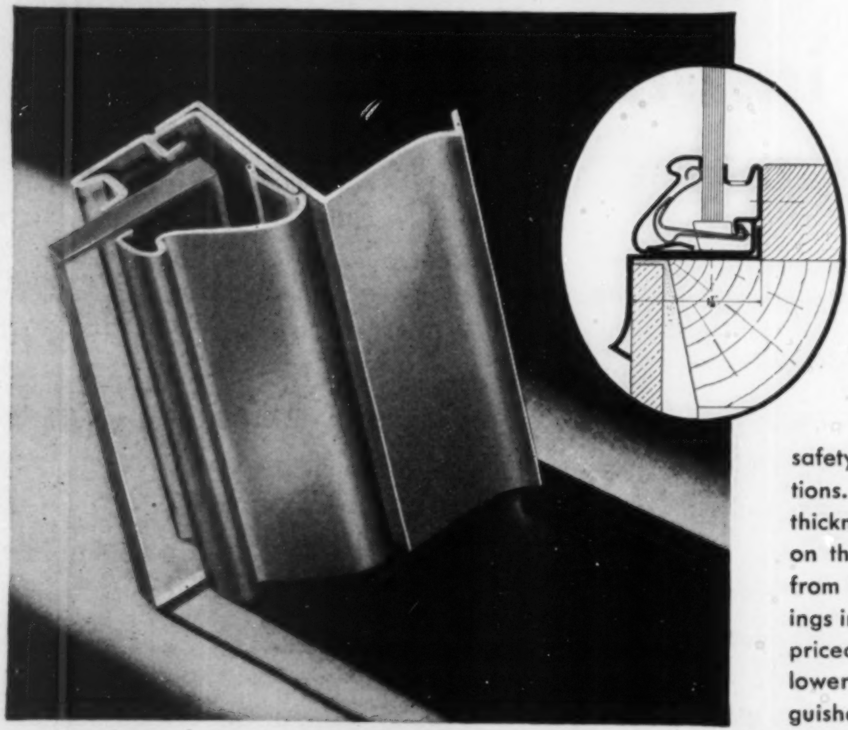
For BEAUTY...use Pittco Metal

YOUR CHOICE OF TWO OUTSTANDING LINES



PITTCO DE LUXE Imaginative styling and planned harmony between members are two factors which help to account for the continued popularity of De Luxe Store Front Metal. Pittco De Luxe offers the architect a wide choice of distinctive pieces with which to create sales-winning store fronts. The extruded process of manufacture assures clean, sharp profiles, sturdy strength, perfect color and finish. Pittco De Luxe is intended primarily for high quality work. In the varied bars, mouldings and sash of the De Luxe line, the architect has a pleasing and impressive solution to many problems of modern store front design.



PITTCO PREMIER A high degree of architectural symmetry is one distinguishing mark of the new Pittco Premier line of store front metal. Like Pittco De Luxe, Pittco Premier was designed as a unit . . . each piece styled to complement and heighten the beauty of the other members with which it may be used. Pittco Premier construction can be set more quickly and easily, with greater safety to the glass than other metal constructions. The sash is self-adjusting to various glass thicknesses, yet always maintains a firm grip on the glass. All setting operations are done from the outside and effect a substantial savings in setting time. Pittco Premier is moderately priced, is light in weight, and provides a shallower reveal for show windows than its distinguished companion line.

PITTCO STORE FRONT METAL

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"PITTSBURGH" stands for Quality Glass and Paint

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WITHOUT
THE ANYSTREAM

Available Now

FOR NEW CONSTRUCTION AND MODERNIZATION

The Speakman Anystream Shower Head is a *must* for any truly modern bathroom installation. The Anystream is three showers in one, delivering a spray to suit any user in any mood. In the flood position, the Anystream is self-cleaning, passing off all sludge, pipe-scale or sediment. Under all kinds of water conditions and under almost any pressure, the Anystream always gives a full, 48-jet shower pattern. It's simple in design, rugged, delivers years of trouble-free service, if given ordinary care.

Money-Saver, Too

Particularly important in hotel, school and institutional installations are the Anystream's water and fuel saving characteristics. In the needle-spray position, it uses up to 58% less water than ordinary shower heads.

The Anystream is sold by leading plumbing supply dealers and contractors. Now available for immediate delivery. For the name of your nearest Speakman representative, and an illustrated leaflet on the Anystream, write for folder S-42. See Sweet's Architectural File for 1946 for a condensed catalog of Speakman showers and fixtures.

"The best in brass since 1869"

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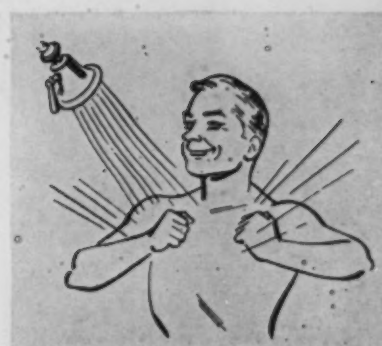

A TURN OF THE LEVER GIVES . . .
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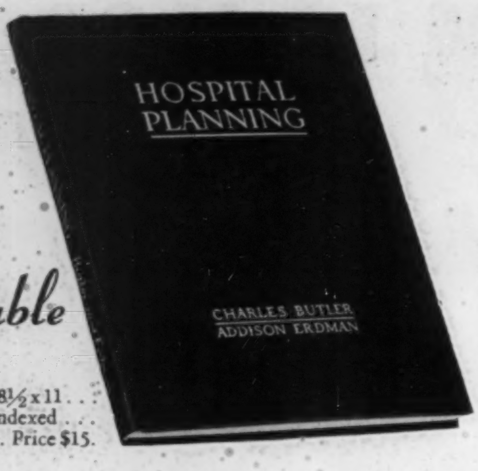

— presents the plans of 51 selected hospitals . . . represents creative efforts of 30 architects. Includes 32 photographs . . . 11 site plans . . . 187 floor plans . . . 38 special unit plans of rooms, wards, departments . . . numerous construction details.

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by Charles Butler, F.A.I.A. *and* Addison Erdman, A.I.A.

A Case-Study Analysis of Modern Hospitals

When "Hospital Planning" first went on sale in June 1946, the rush for copies exhausted the initial print order within a matter of weeks.

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And here is the reason. Toncan Iron is made from refined open-hearth iron which contains a minimum amount of rust-inviting impurities. To this, twice as much copper is added as there is in copper-bearing steel. An exact amount of molybdenum is included to increase the effectiveness of the copper. The result is a material that has the highest rust-resistance of any ferrous material in its price class.

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For complete details on Toncan Iron, write for Booklet 406, "A Few Facts About Toncan Iron for Architects and Engineers."

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Now—
Heavy Duty
Molded SAFETY

Step Treads in marbleized blue-gray and tan patterns give appealing beauty with long-lasting service. . . . MELFLEX SAFETY Treads are molded 3/16 inch thick of special "frictioned" rubber compound to cover both the tread and step-edge. Approved by Underwriters Laboratories, Inc. (No. SA 833) as a SAFETY feature, this molded tread applies without requiring metal strips or screws. It stays "put", won't buckle or blister when applied simply with MELASTIC Water-Proof Cement to wood, stone, metal or composition steps. . . .

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It cushions step edge as well as provides sure-gripping tread safety, *wet* or *dry*. These Treads, also available in black compound, may be applied on inside or outside steps with equal safety and service.

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Compounded of special "frictioned" rubber for hard wear and slip-proof service, MEL-ISLE makes the ideal covering for aisles, runways, corridors, locker rooms. Available in black only 1/8" and 3/16" thick, 36" wide and cut to any specified lengths. High ribbed pattern facilitates cleaning and keeps tread surface slip-proof. MEL-ISLE Molded Mats, for entrances, 3/8" thick and in 5 stock sizes have beveled edges to prevent tripping. Slip-Proof *wet* or *dry*. . . . Durable, Economical.

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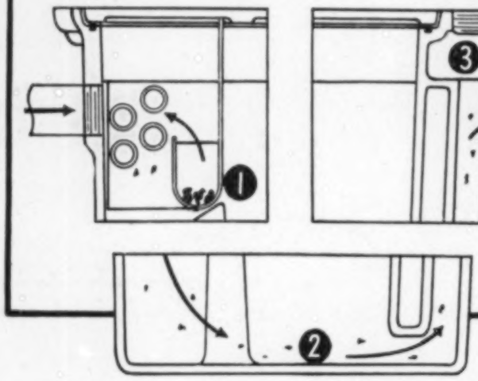
What do I buy in a

HYDRA FILTER?

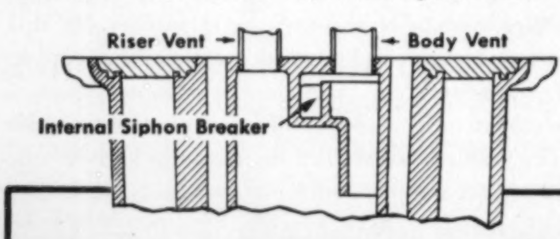
NOT ONLY double action grease interception

BUT ALSO these features:

1. *Selective Handling of Solids*
2. *Smooth Non-Clogging Bottom*
3. *Complete Protective Venting*



The Wade HydraFilter grease trap goes far beyond introducing its new principle of hydraulic filtering. Let us cut a HydraFilter apart and look at three other built-in features: (1) Special trough retains dense bits of bone, glass, metal that might clog waste lines further on. (2) Smooth unobstructed floor helps HydraFilter eject lighter solids such as vegetables, keeps it from becoming a garbage receptacle. (3) Triple venting consists of body



and riser vents with optional top or side outlets, and an internal siphon breaker. These prevent emptying of trap by siphoning or built-up pressure.

This is the third of a series of facts about the Wade HydraFilter. We will send on request a fuller description in our booklet, "A New Principle of Grease Interception."

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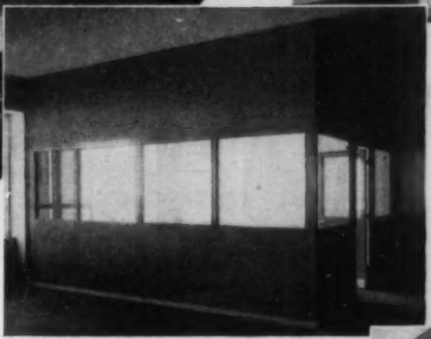

A few interior close-ups of partitions, clothes closets and doors

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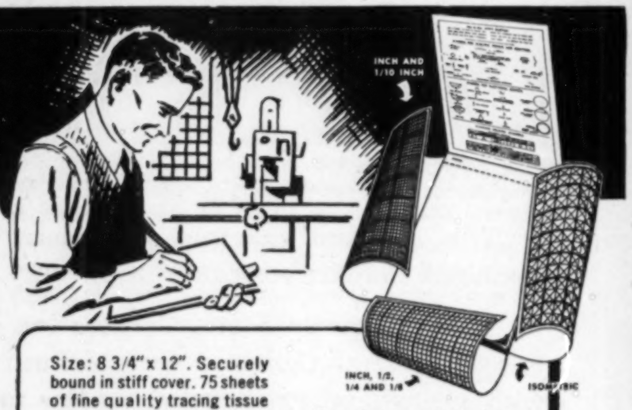

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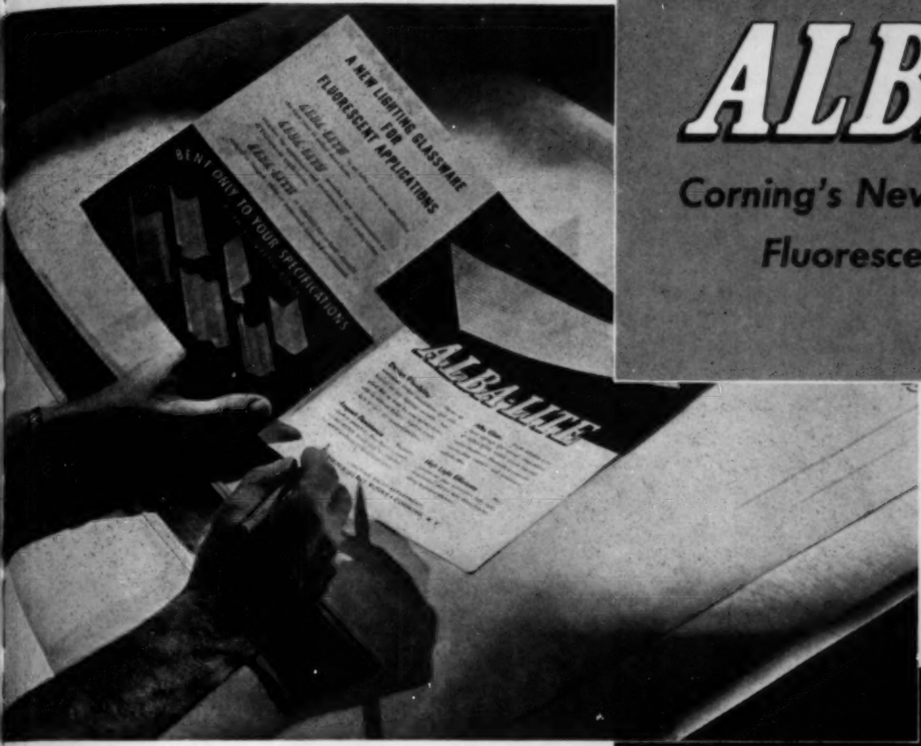
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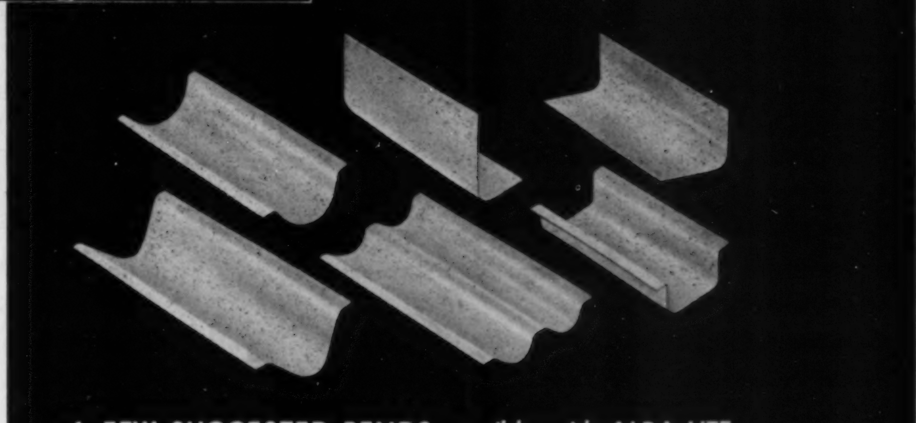

A FEW SUGGESTED BENDS *possible with ALBA-LITE*

IMPORTANT FEATURES OF ALBA-LITE

Color Selectivity ALBA-LITE is a light opal glass transmitting the full color spectrum.

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Some of the many applications for ALBA-LITE

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ALBA-LITE, because of its design flexibility and the new opportunities it offers to improve appearance and performance, is fast becoming one of the most popular glassware products ever offered for fluorescent lighting.

ALBA-LITE is offered in rolled sheet form—flat or bent—straight-edged or flanged—plain or patterned—to comply with your specifications. Lighting engineers like it because it offers almost unlimited design flexibility and an attractive appearance, lighted or unlighted. That's why you should specify ALBA-LITE for your next lighting job. Corning Lighting Engineers will gladly work with you on any lightingware problem. For complete details and samples write to Lighting Sales Dept. AR-12

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Send for free sample of ALBA-LITE and compare it with the glass you are now using

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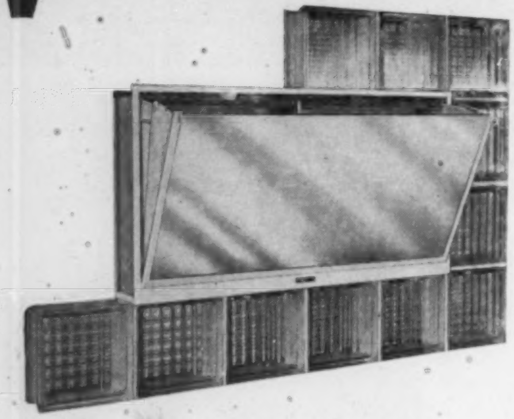
Add beauty and ventilation

TO GLASS BLOCK CONSTRUCTION *with*

WINCO VENTILATORS



For offices, stores, and home baths and kitchens.

Exterior glass block construction is not complete without Winco Ventilators.

Admits light and ventilates like a window—will not admit rain, flies or insects when open. Entire unit in steel frame sets in mortar—complete with interior "vaned" glass panel and exterior bronze screen which are removed during construction. 6 sizes: for 6" blocks and 8" blocks.

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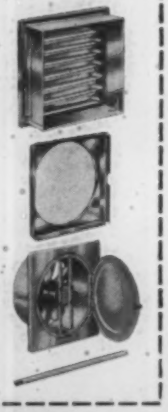

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For home kitchens and offices. Metal frame easily installed in 6" or 8" glass blocks, in openings of 1 or 4 block displacement or in standard frame walls. Others for 9" to 13" brick walls. Complete with fan, motor and automatic door switch.

Detailed specifications, illustrated literature and prices on these modern Winco installations sent upon request.

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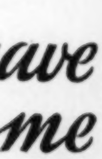

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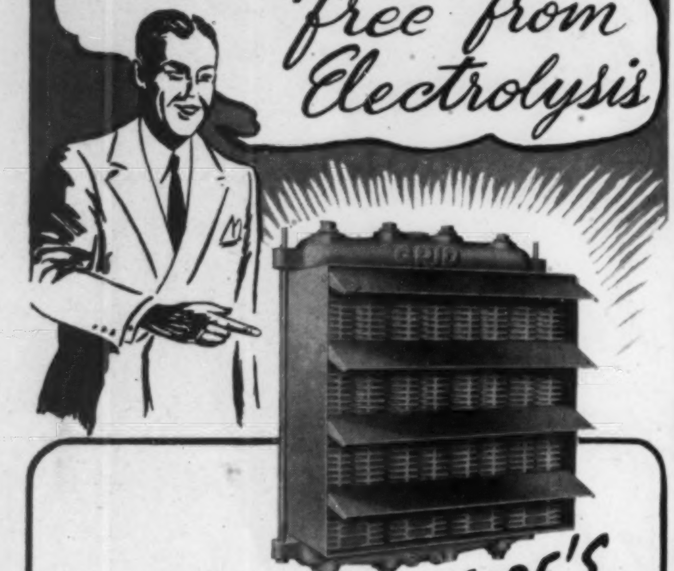
The Only Unit Heater positively free from Electrolysis



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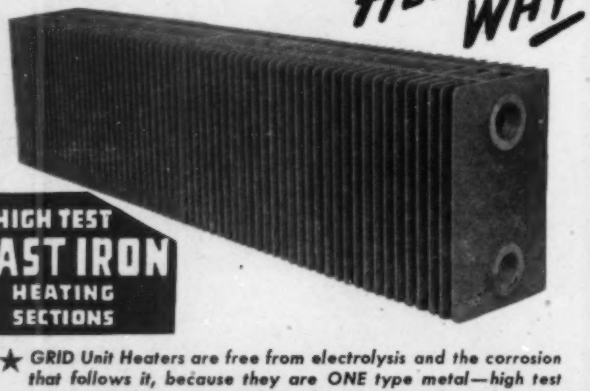

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CAST IRON
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- ★ *GRID Unit Heaters are free from electrolysis and the corrosion that follows it, because they are ONE type metal—high test cast iron—the same metal as the steam supply and return pipes, and the boiler itself.*
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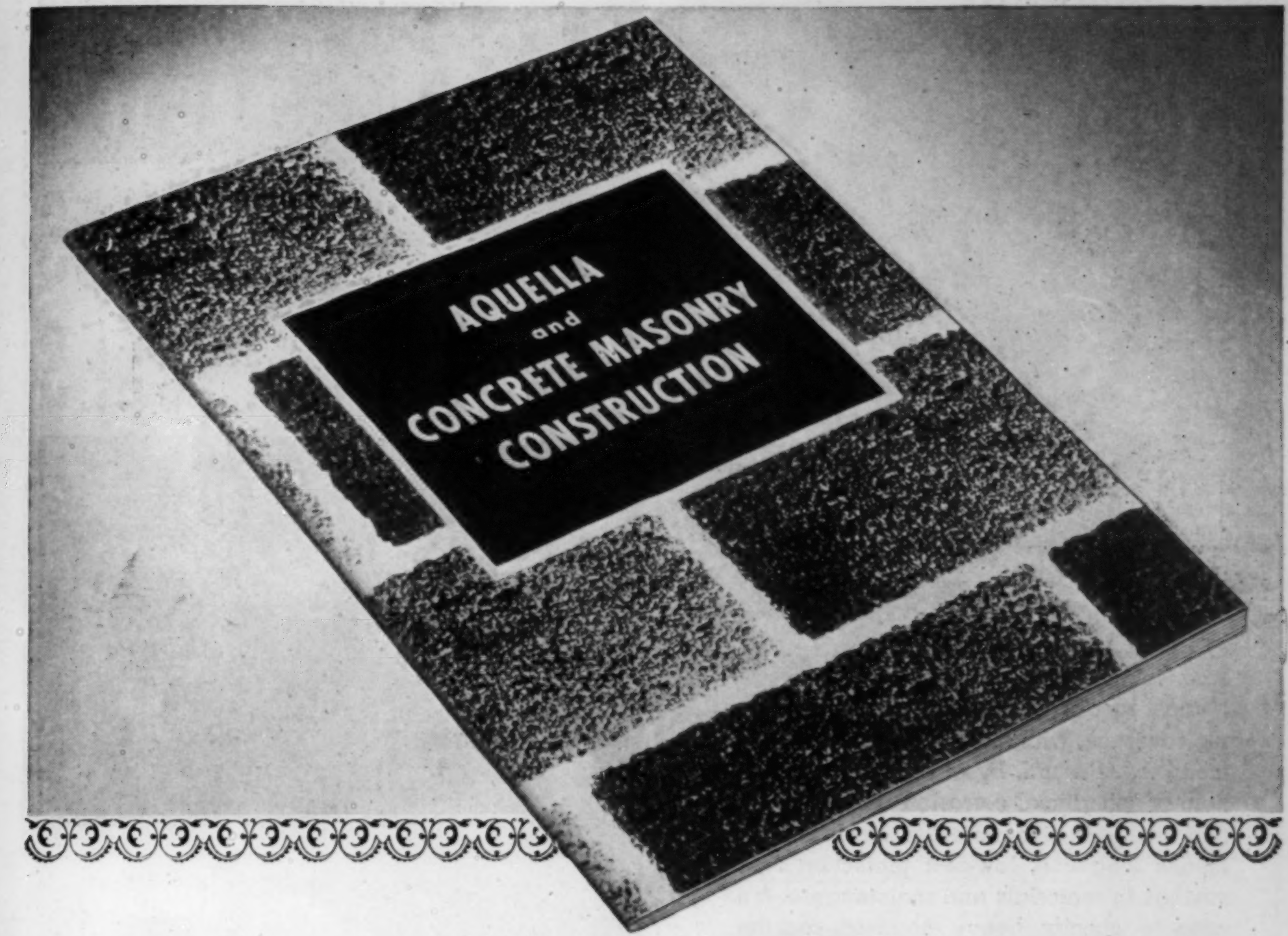

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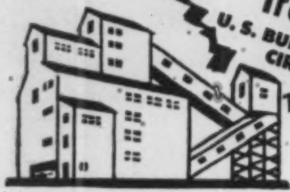

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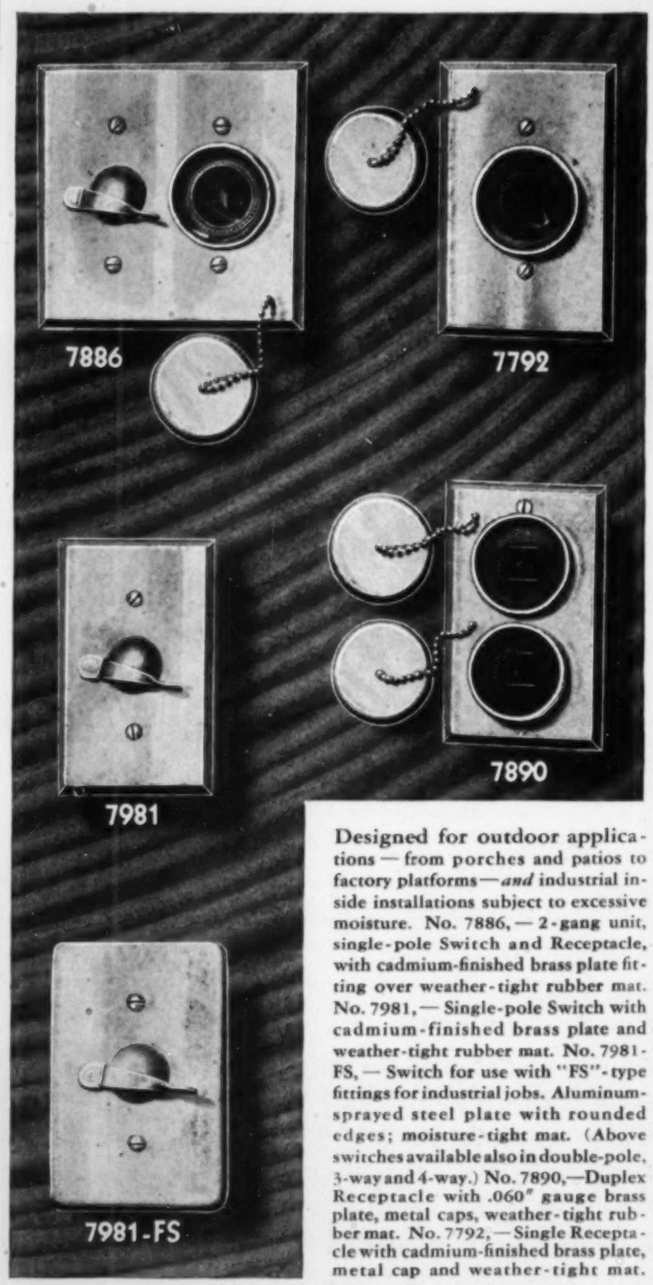

Designed for outdoor applications — from porches and patios to factory platforms — *and* industrial inside installations subject to excessive moisture. No. 7886, — 2-gang unit, single-pole Switch and Receptacle, with cadmium-finished brass plate fitting over weather-tight rubber mat. No. 7981, — Single-pole Switch with cadmium-finished brass plate and weather-tight rubber mat. No. 7981-FS, — Switch for use with "FS"-type fittings for industrial jobs. Aluminum-sprayed steel plate with rounded edges; moisture-tight mat. (Above switches available also in double-pole, 3-way and 4-way.) No. 7890,—Duplex Receptacle with .060" gauge brass plate, metal caps, weather-tight rubber mat. No. 7792, — Single Receptacle with cadmium-finished brass plate, metal cap and weather-tight mat.

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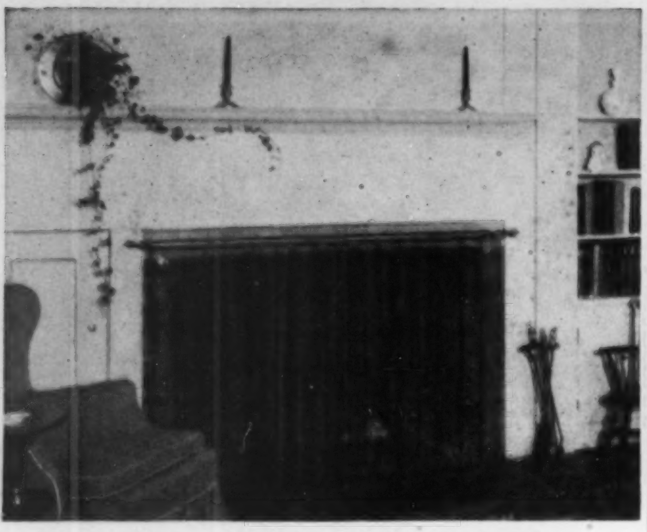

BENNETT

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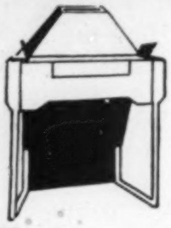
FIREPLACE UNIT



You Face New Problems

with the fireplace in the modern home

As you know, a fireplace when burning exhausts more than 200 cu. ft. of air per minute from the living quarters of a house. If tightly constructed, replacement air cannot enter from outdoors in sufficient quantity to supply the chimney draft. Result: partial vacuum, back-puffs, and smoke. If sufficient replacement air *can* enter, it lowers the average temperature of the entire house, cold drafts sweep the floor and automatic furnace controls are out of balance.

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For camps, summer and southern homes—places without furnace heating (also basement "playrooms") the *Bennett Warm-Aire Fireplace Unit* is recommended.

Flexscreen
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To add beauty and full protection—every fireplace should have a *Bennett Flexscreen*—the safety fireplace curtain.

For complete details
Send today for Bennett Fireplace Catalog—or see Sweet's

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You can make your buildings safer and easier to maintain at low cost by specifying "CZC"-treated wood. For additional information on this wood preservative that gives additional long life to wood, write E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Del.

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MAKES WOOD RESIST DECAY · REPEL TERMITES · RETARD FIRE

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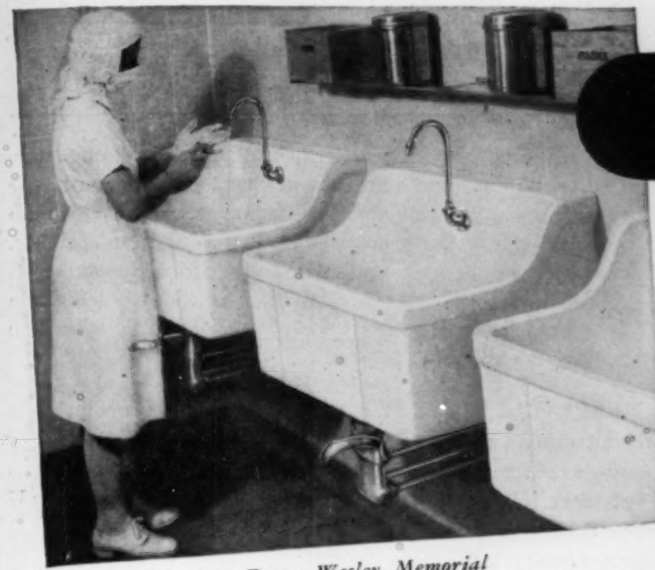
...THROUGH CHEMISTRY

Duraclay *

for hospitals you are planning



Surgeons' Scrub-up Room, Wesley Memorial Hospital, Chicago.

Examination room, Children's Memorial Hospital, Chicago.

Check the leading hospitals built during the past ten years and you will find that in an amazingly large percentage of cases, architects have used Crane Duraclay fixtures.

There are two reasons why Crane plumbing is favored by architects and hospital administrators: First, the Crane line includes specialized fixtures to meet every need, designed in cooperation with famous surgeons and hospital experts. Second, Crane fixtures are available in Duraclay—an all-ceramic material developed to meet the specialized needs of hospital service.

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Duraclay has a hard glazed surface that defies scratching and abrasion.

Duraclay is impervious to acids and highly resistant to staining.

Duraclay is smooth, gleaming, easy to clean and offers the maximum in sanitation.

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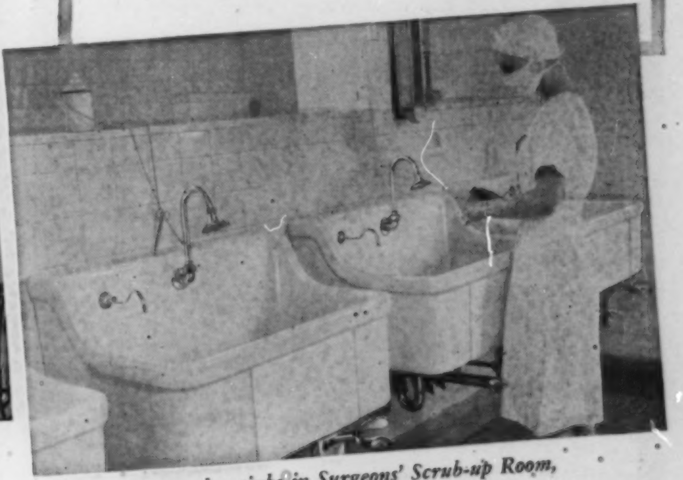
Duraclay sinks in Endoscopic Room of a large Evanston hospital.



Duraclay sinks in Surgeons' Scrub-up Room, St. Francis Hospital, Evanston.

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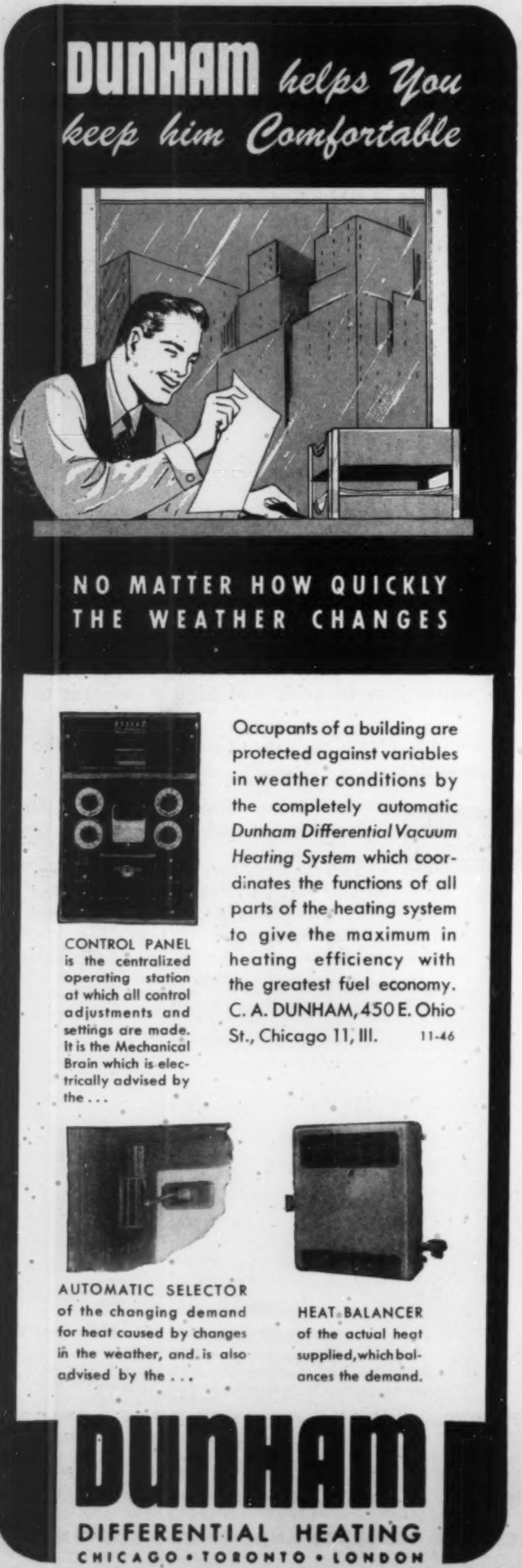

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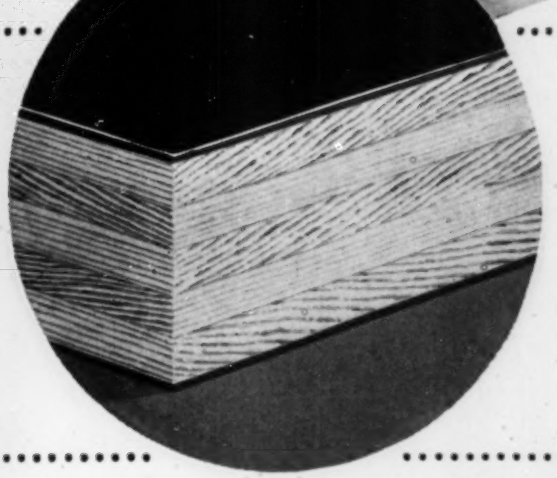

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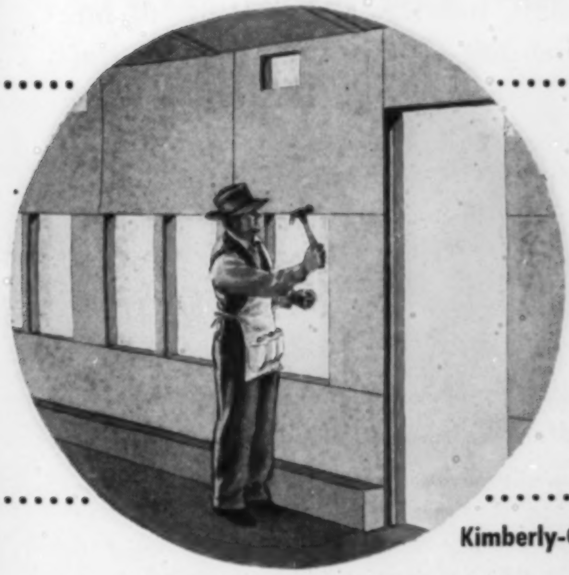

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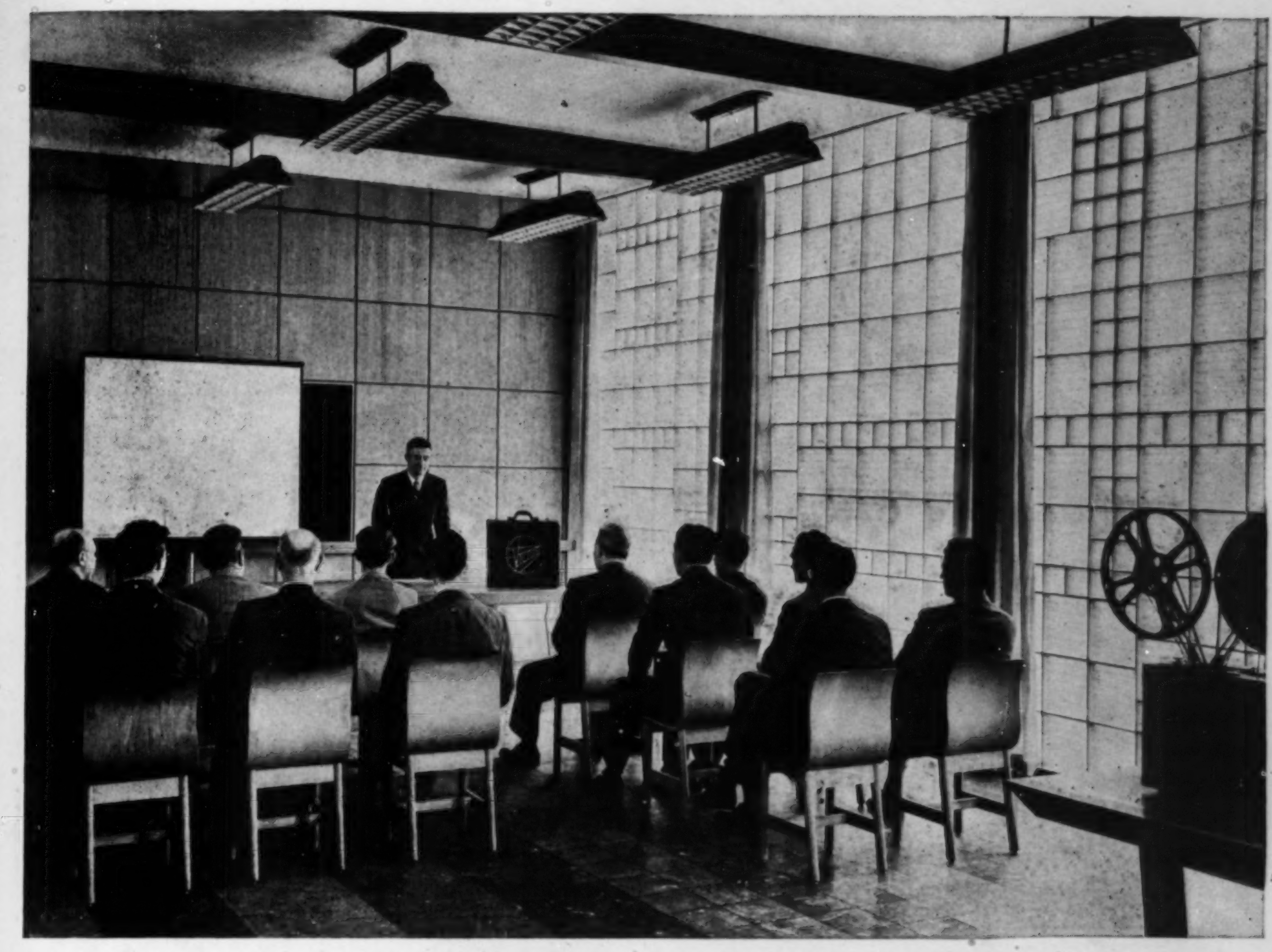

Note the unusual use of 12″ and 6″ square Insulux Glass Block in the floor-to-ceiling panel in this conference room. Architects Perkins, Wheeler & Will, Chicago, selected Insulux for Benjamin Electric Mfg. Company's new product development and testing laboratory. Bi-lateral daylighting is accomplished by a clerestory panel of Insulux on wall opposite that shown.

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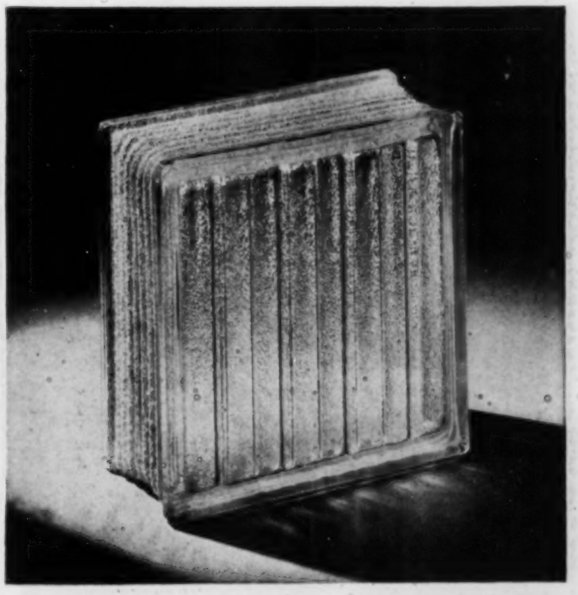

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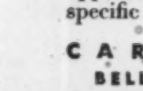

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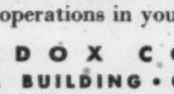

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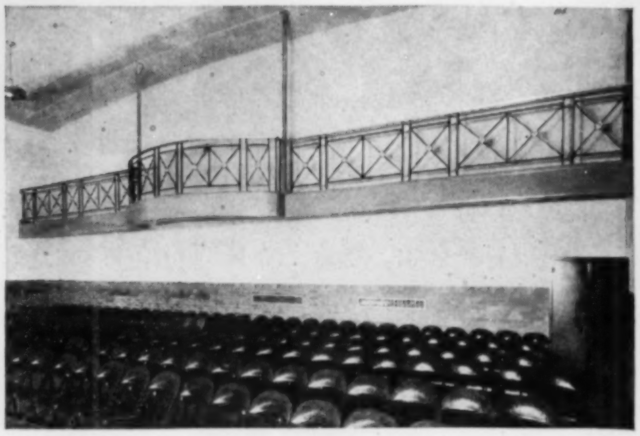

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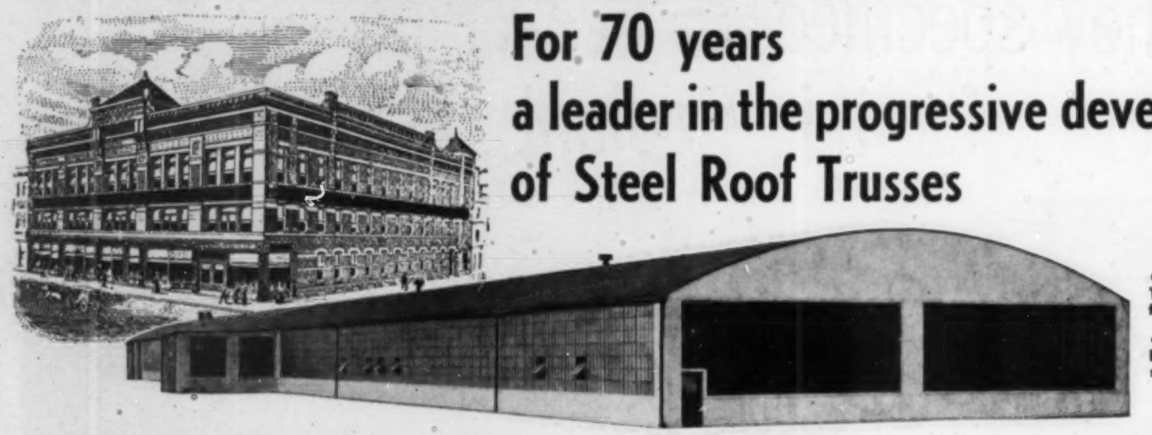

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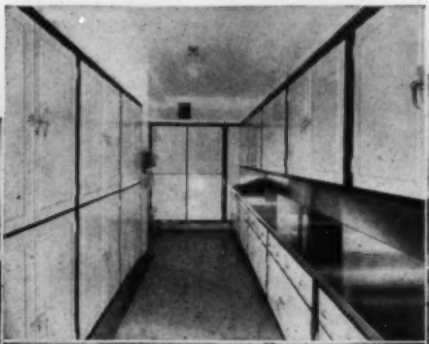
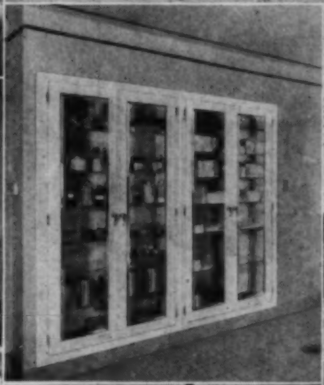
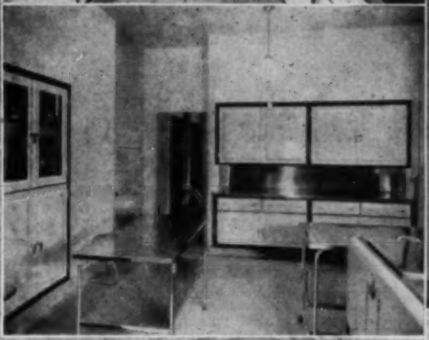


Sterile Dressings Room, Central Service Department.

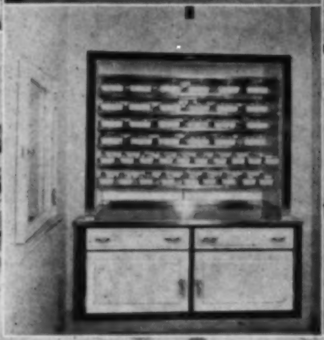


Supply Cabinet in septic operating room.

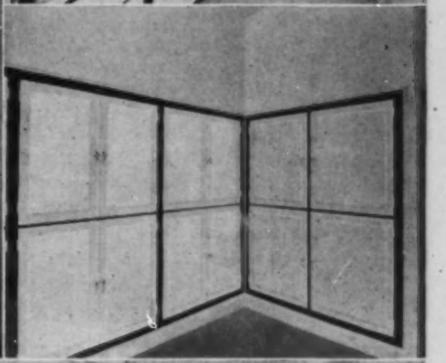
Sterile Operating Supplies Room, Central Service Department, Surgical Floor.



First Floor Central Service Department. One cabinet has upper section for warming of solutions, fitted with two electrically heated shelves with thermostat and pilot light; plate glass doors.



Maternity department. Upper section open and equipped with adjustable stainless steel shelves for holding mothers' treatment trays.



Storage cabinet in sterile supply room Central Service Department, maternity floor. Cabinets have upper and lower compartments each with metal doors and two adjustable metal shelves.

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4. Recessed cabinets in splint room, surgical floor—three equipped with swinging type harness hooks for splints and fracture equipment; others with metal shelves and plaster barrel compartments.
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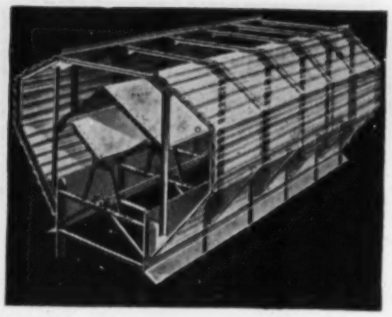

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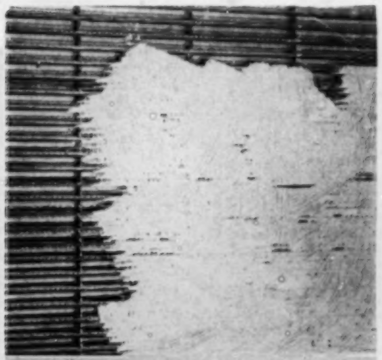

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• Below: Note how the back surface of plaster on Milcor Metal Lath becomes permanently "clamped" to the steel.

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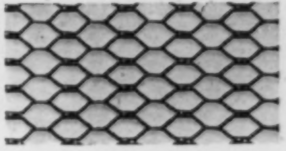

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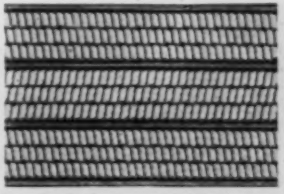

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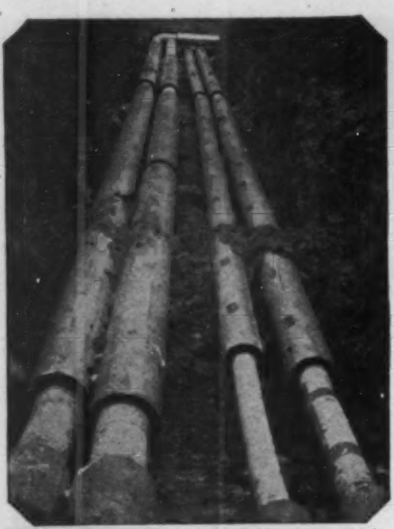

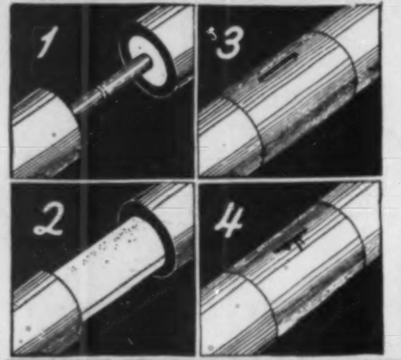

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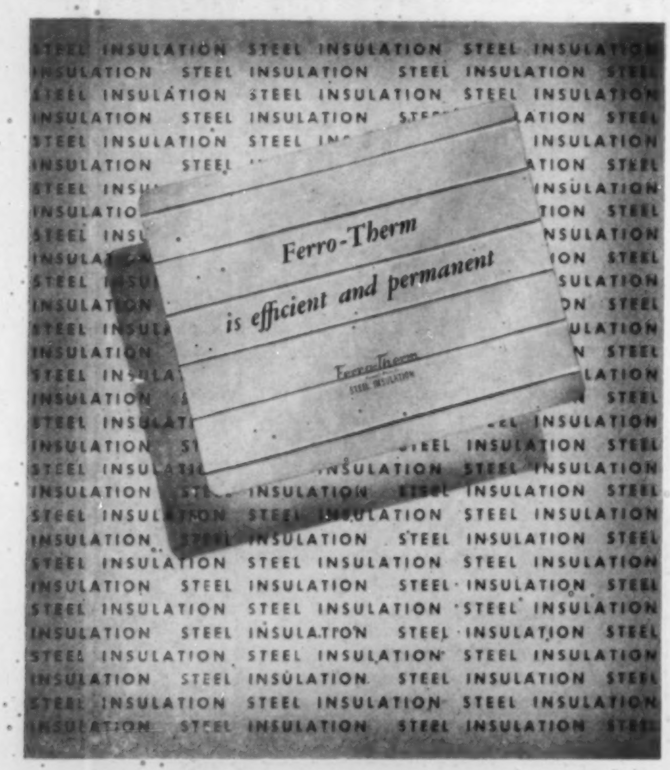

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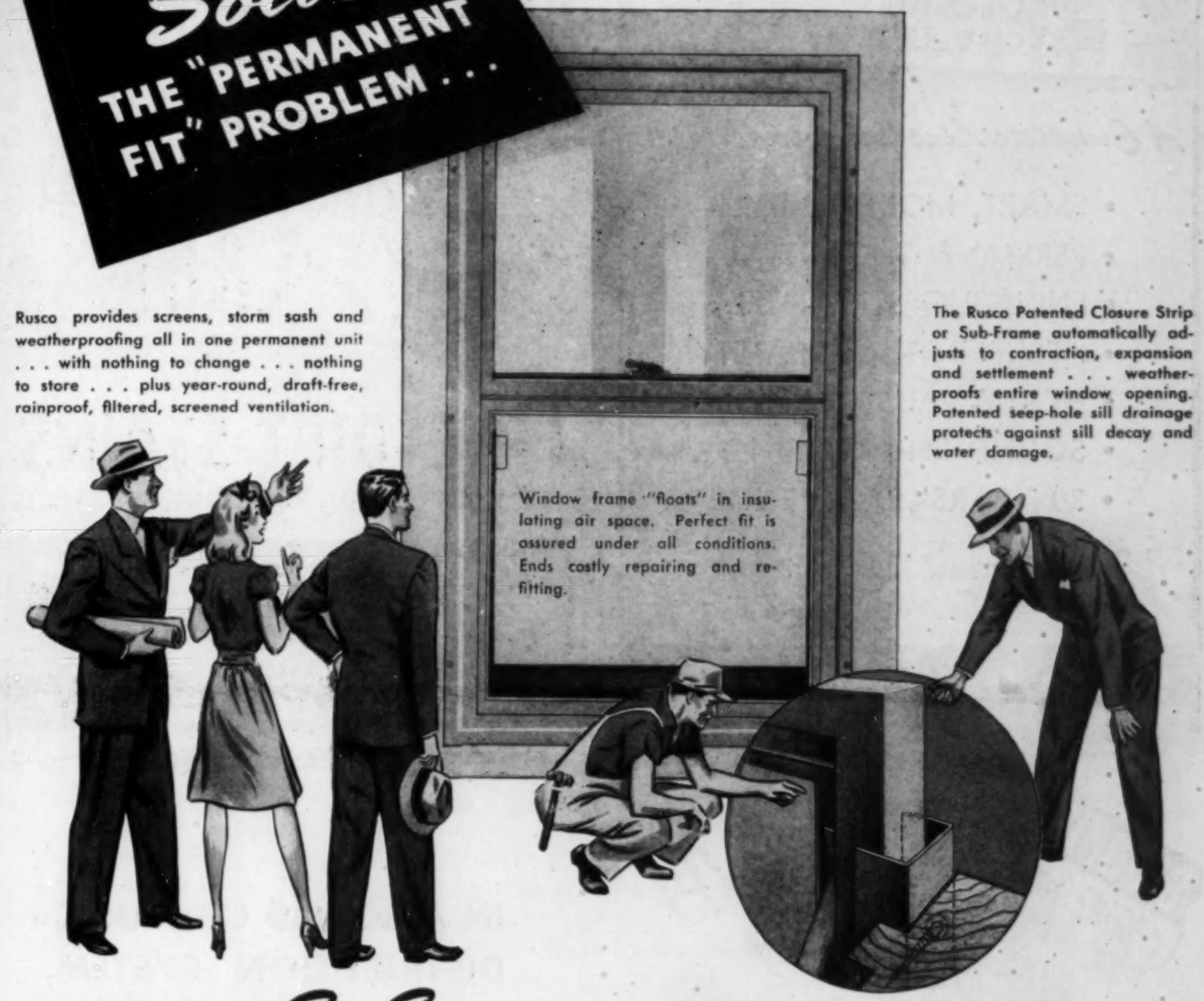

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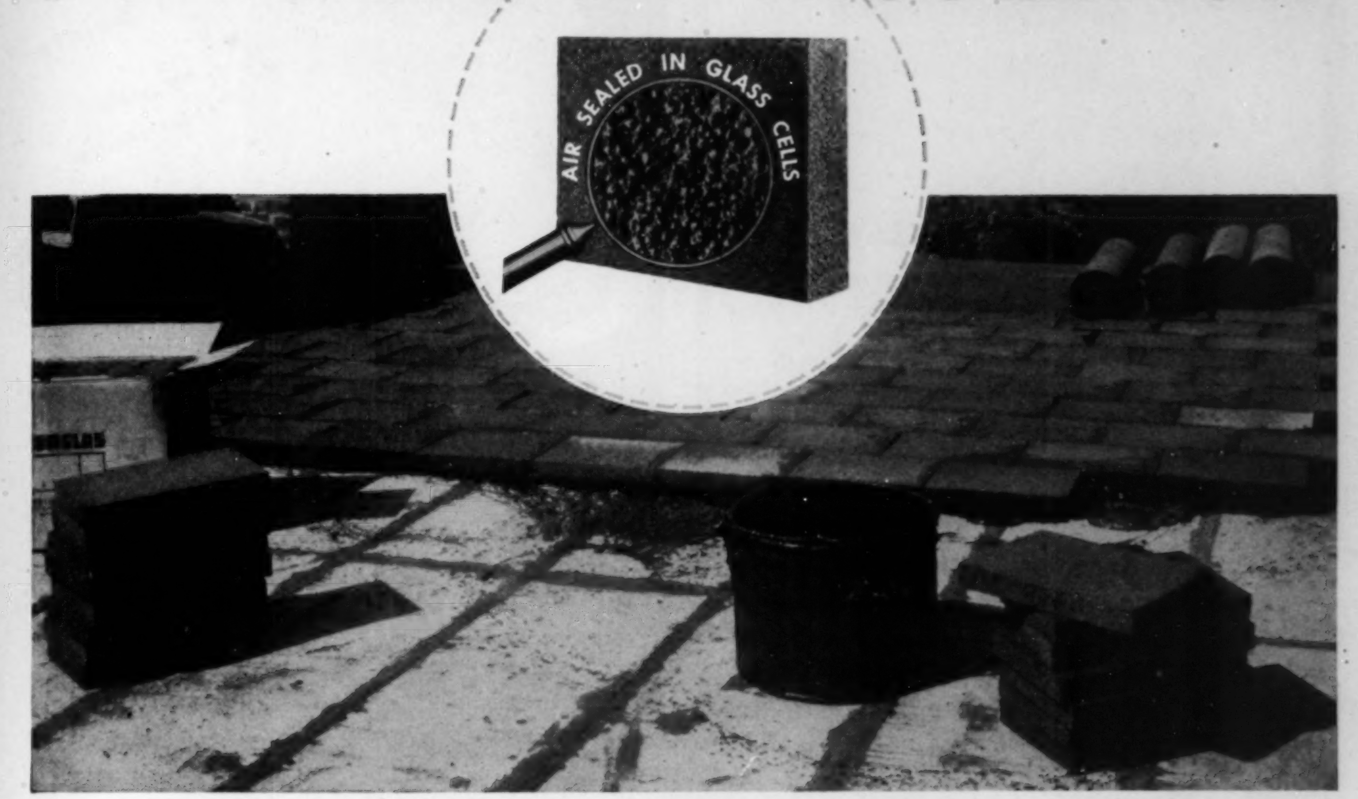

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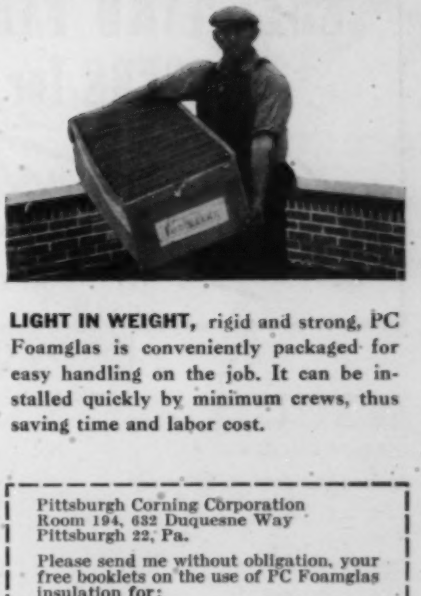

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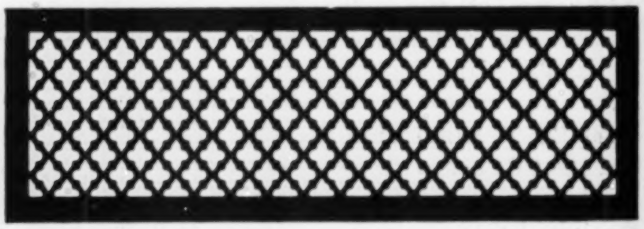

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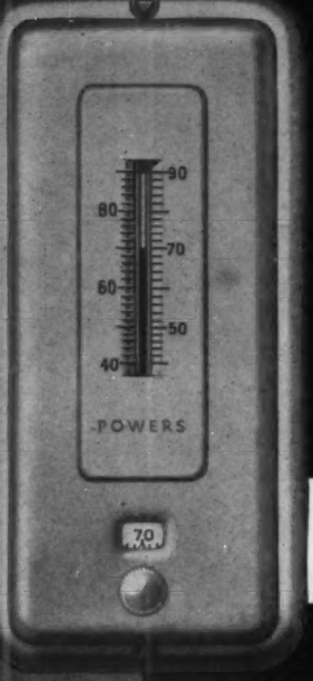

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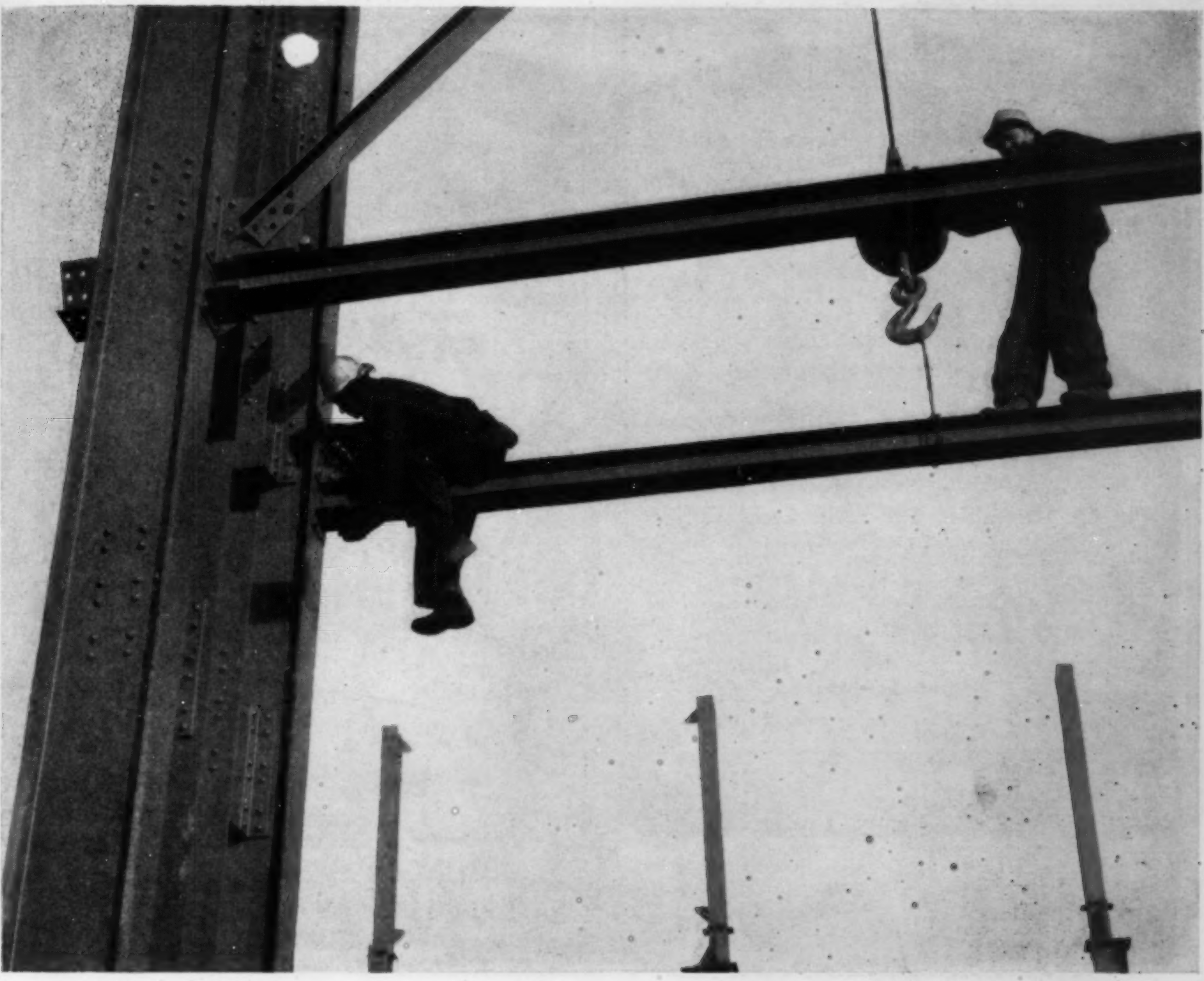

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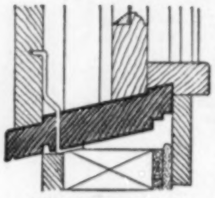
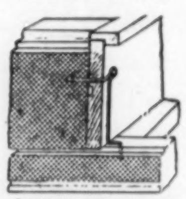


MULL CENTER CLAMP



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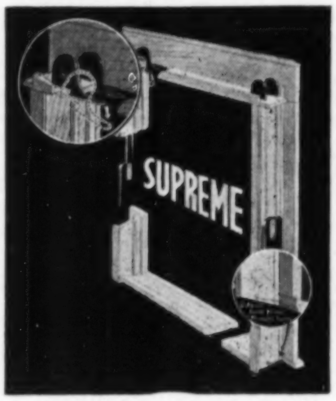

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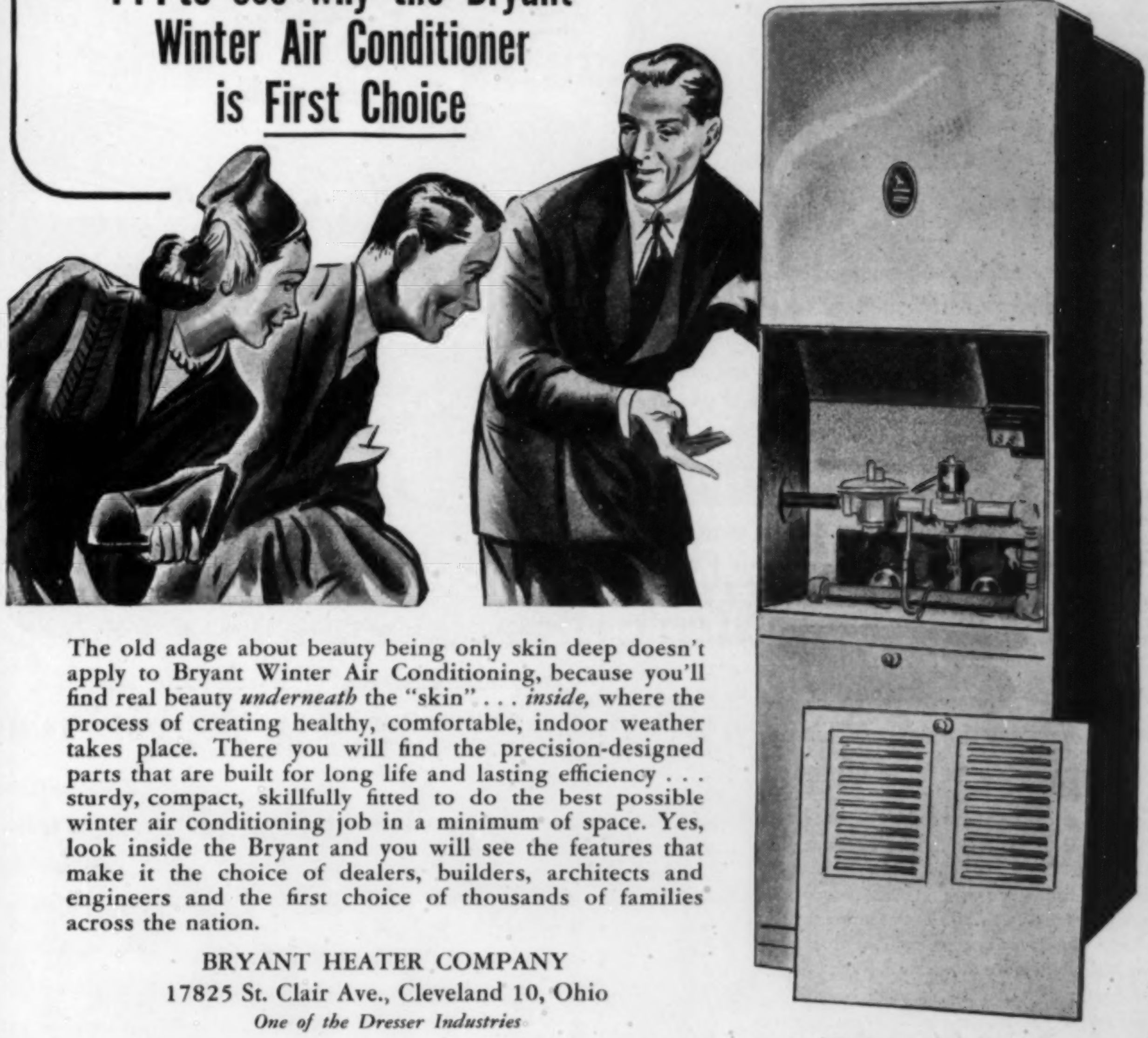

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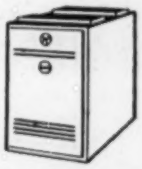

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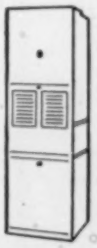

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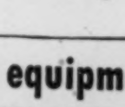

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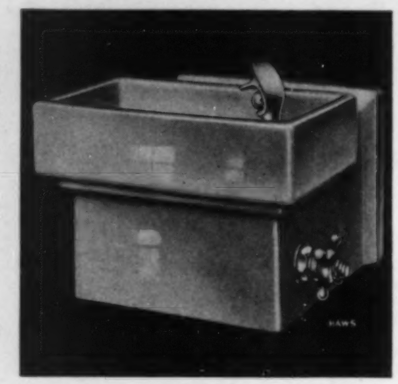

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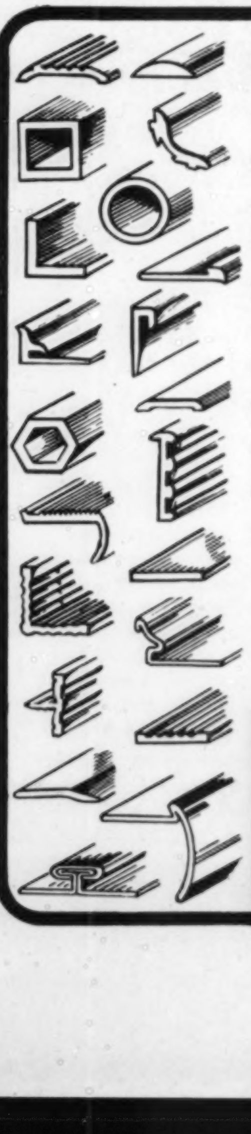

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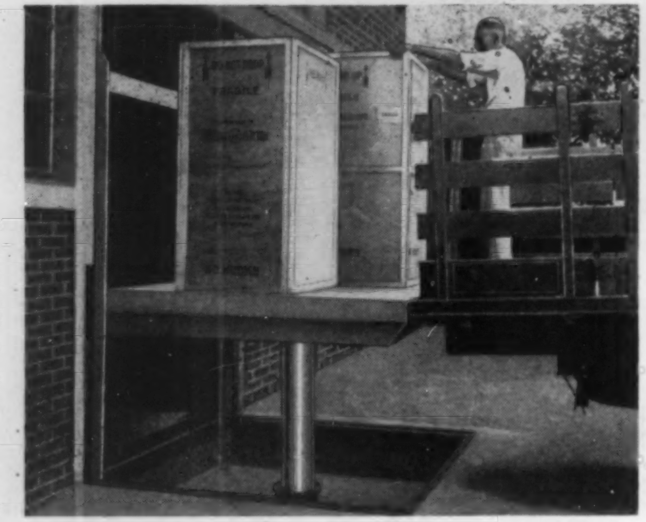

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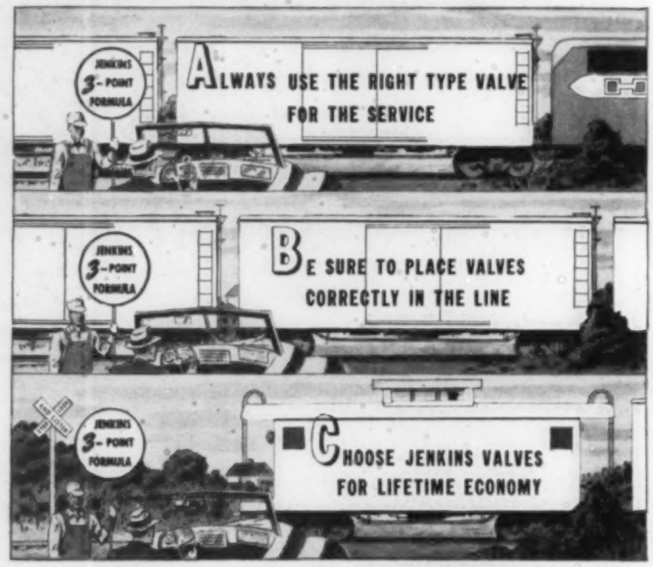

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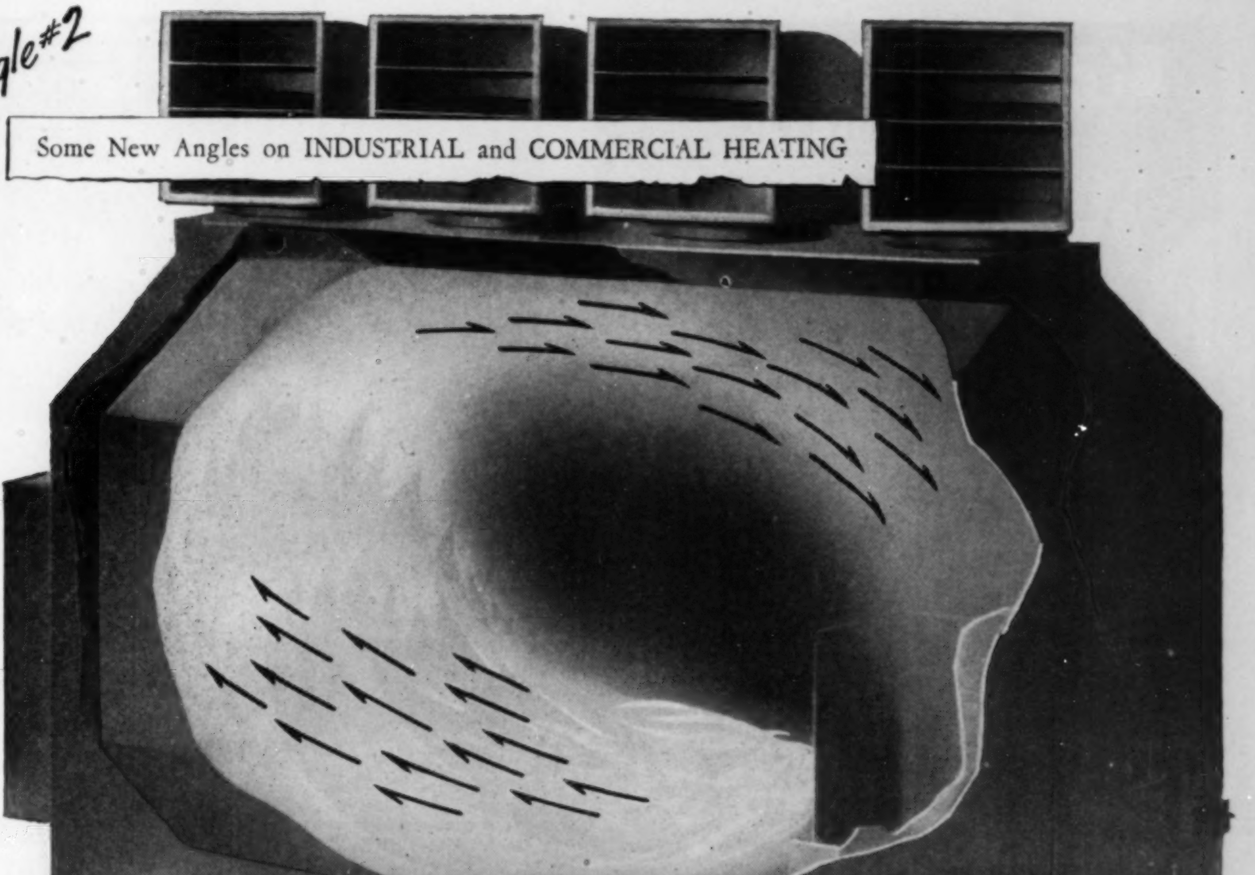

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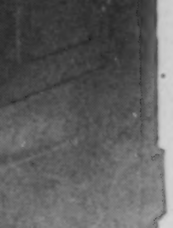

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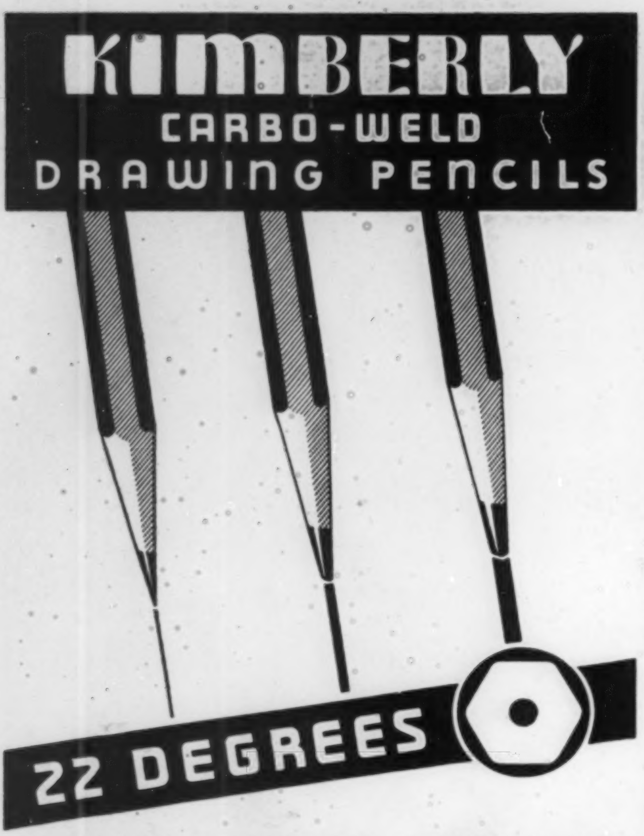

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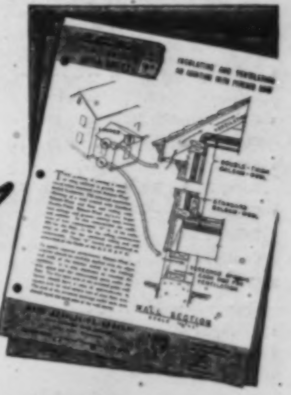

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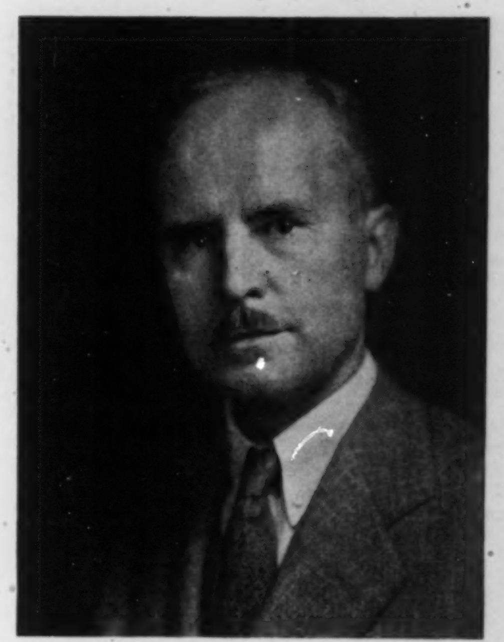

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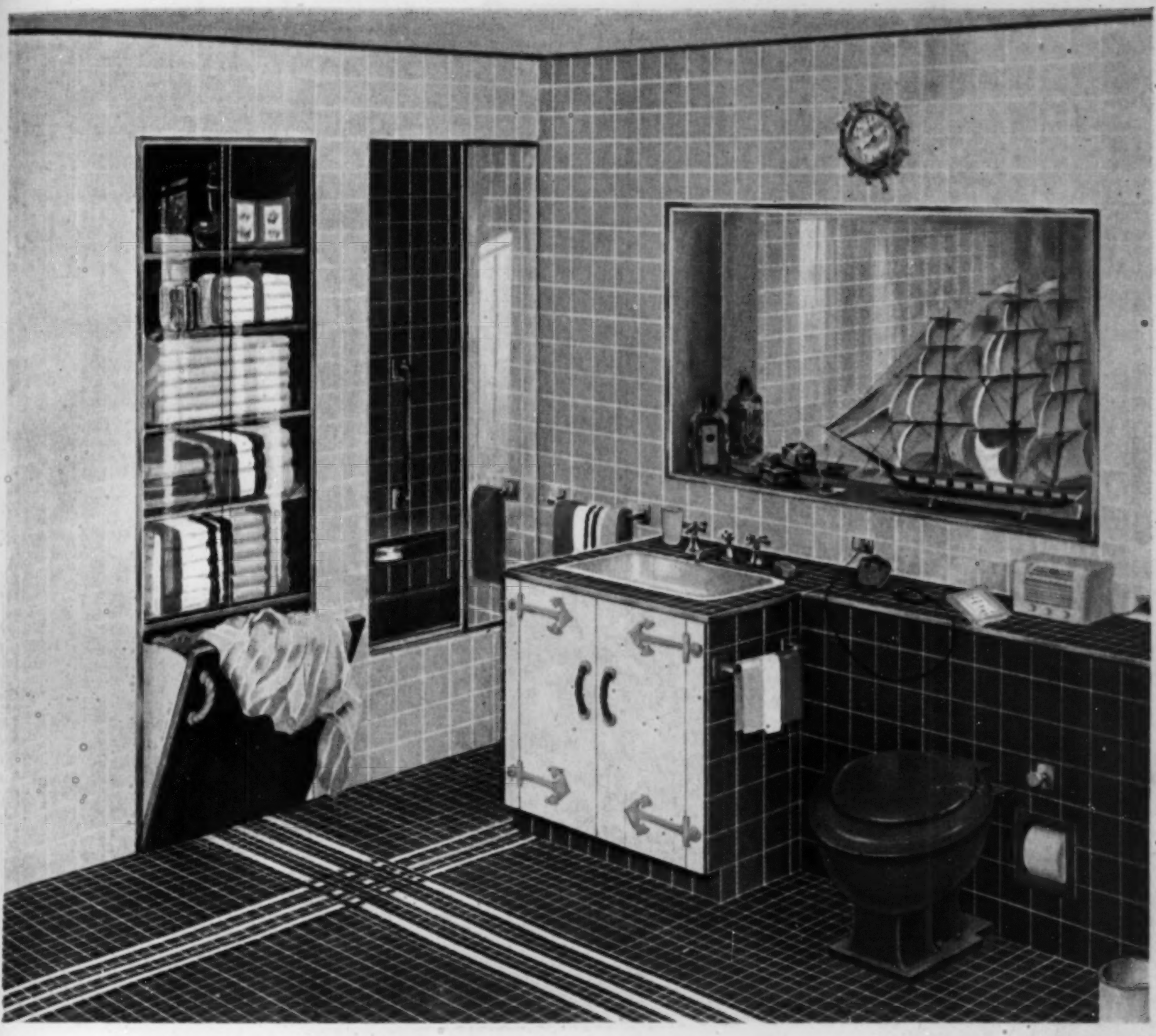

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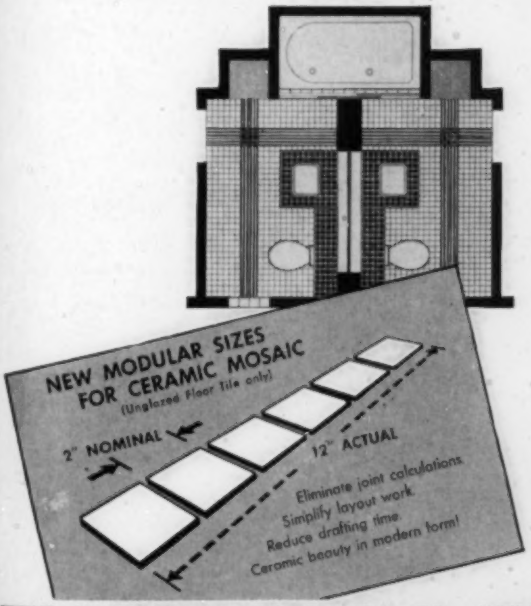
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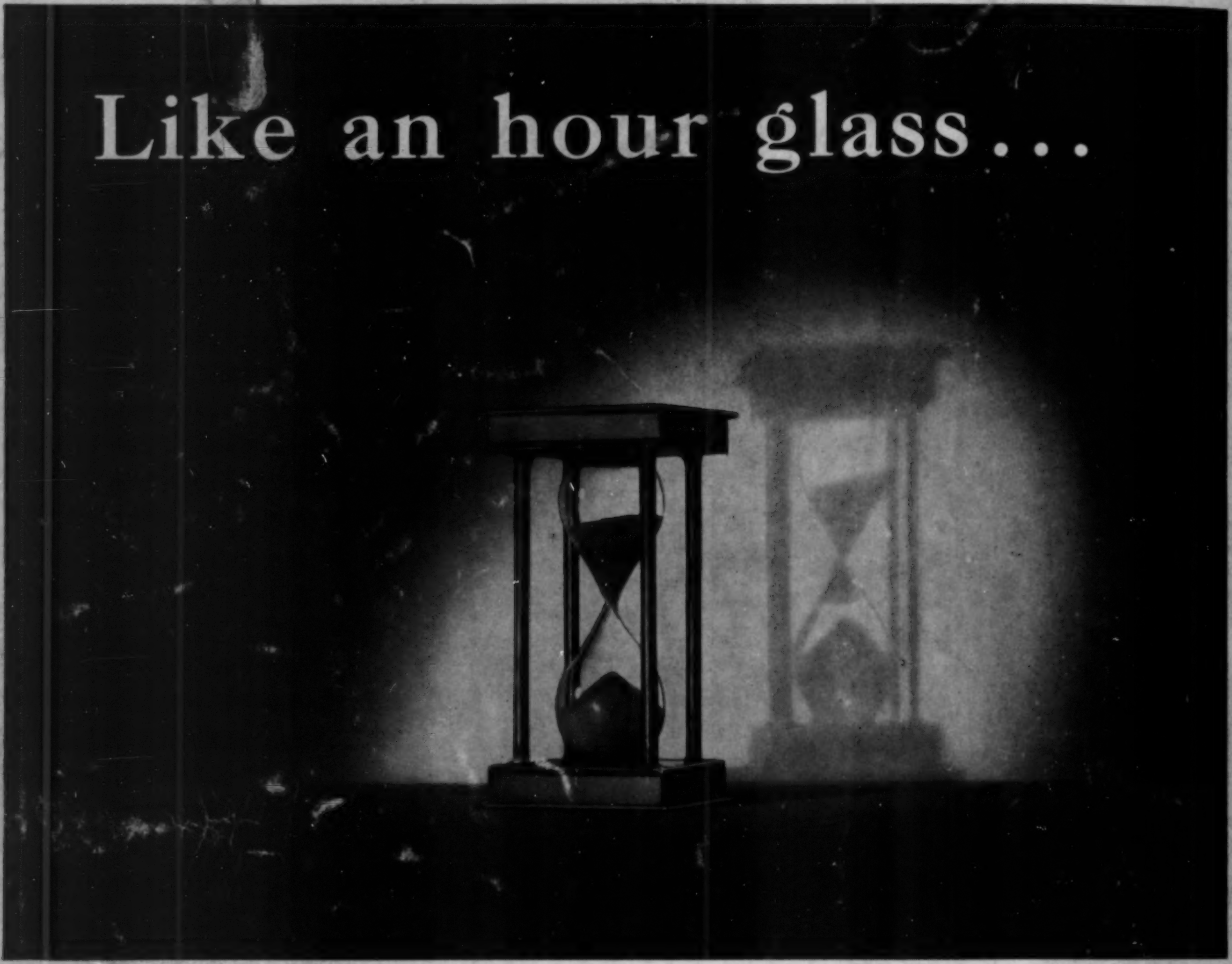

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